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MINES AND MINING

WEEKLY

Vol. 14 1824 CURTIS STREET, DENVER, COLO. No. 13

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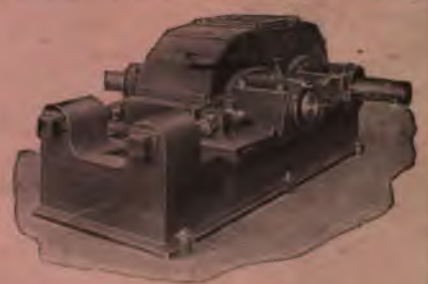

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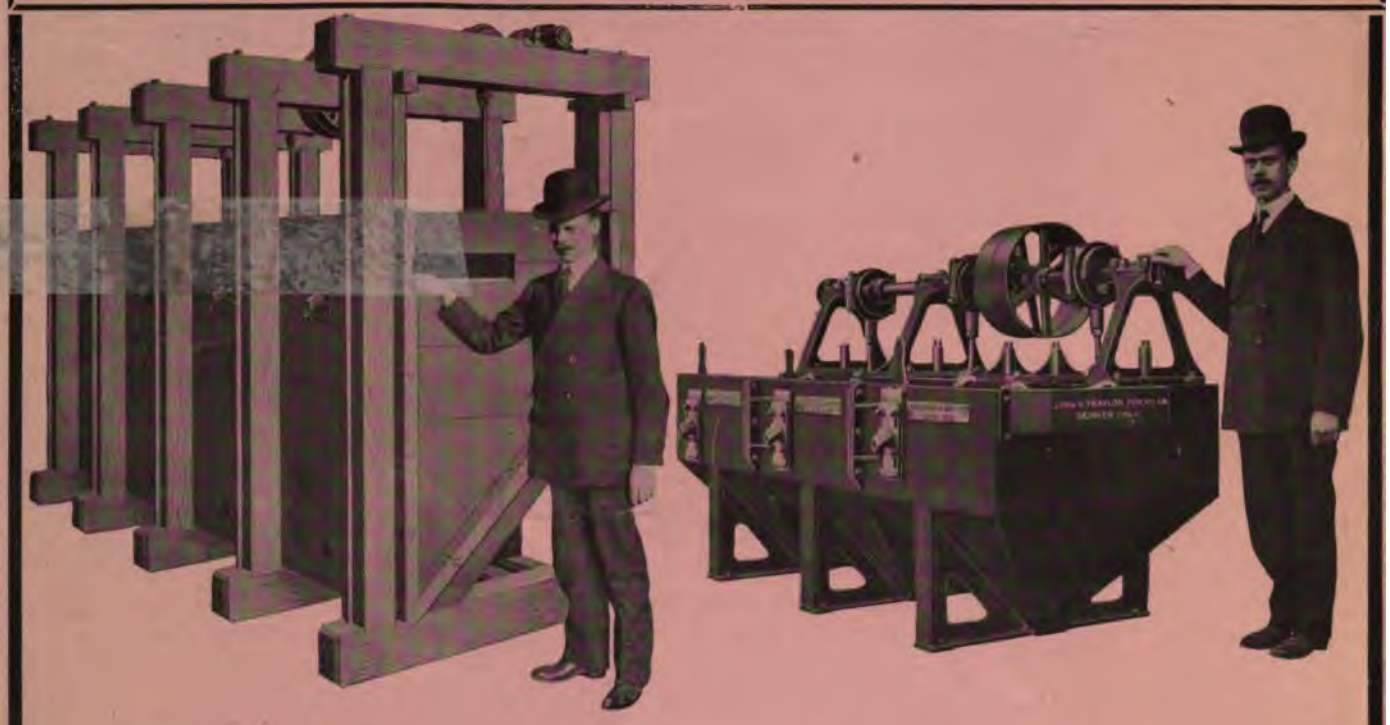

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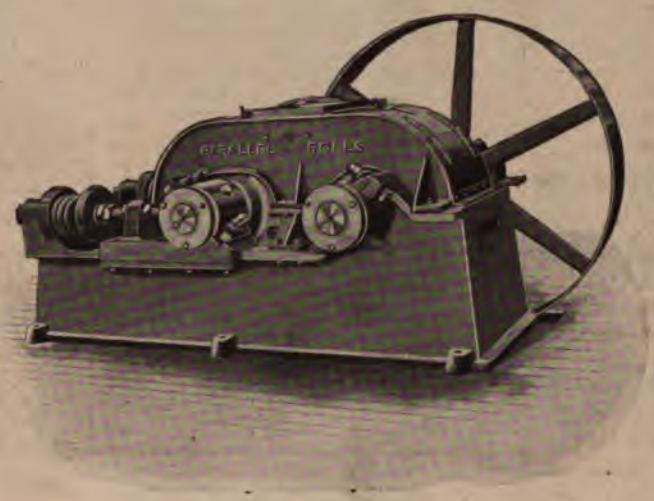

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MINES AND MINING

WEEKLY

Vol. XIV Denver, Colorado, July 5, 1907 No. 13

MINES AND MINING

A. J. CASEY.....Manager
C. L. HALL.....Editor

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Diamond Not the Hardest Substance

For hundreds of years diamond was supposed to be the hardest substance in the world. From it originated the old proverb, "Diamond cut diamond." In the arts it was found that nothing would polish diamond but diamond. Recently another substance has come into use, which, it is claimed, will replace the diamond for polishing and drilling purposes. It is the metal known as tantalum, not a common metal nor one of the most rare.

Tantalum is so hard that the only effect produced by a diamond drill, worked day and night for three days on a sheet of the substance one-twenty-fifth of an inch thick, with a speed of 5,000 revolutions per minute, was a slight dent in the sheet and the wearing out of the diamond.

This exceedingly hard metal was discovered more than a century ago, but no attempt to separate it from its compounds had succeeded prior to 1903. In that year Meissan obtained a sample in the electric furnace, although it was mixed with carbon. Pure tantalum was first prepared by Dr. Bolton, a member of the famous electrical engineering firm of Siemens & Halske.

Tantalum differs from all other known substances in combining extreme hardness with extreme ductility. When red hot it is easily rolled into bars and sheets or drawn into wire. It is scarcely affected by the oxygen of the air, even at a red heat, and not at all at ordinary temperature, and the strongest acids fail to dissolve it, nor does it amalgamate with mercury. It melts only at the highest attainable temperatures, and is therefore well fitted to serve for filaments in incandescent lamps, being much stronger than carbon. A pound of it will make twenty thousand lamps, and these require exactly half as much power to light them as do carbon filaments giving the same brilliancy.

Machinery In Australia

The Hon. John P. Bray, consul general at Melebourne, Australia, reports that metal goods and machinery show marked increase in Australia during the past year. The principal articles of metal goods imported during 1906 amounted in valuation to $16,479,695, against $12,624,280 in 1905. By articles the imports included the following: Pig iron, 49,223 tons in 1906, against 34,085 in 1905; iron bars, rods, etc., 26,455 tons in 1906 and 23,767 tons in 1905; rails, 26,046 in 1906 and 15,052 in 1905; wire products, 20,742 tons in 1906 and 14,892 tons in 1905; galvanized iron, 60,883 tons in 1906 and 54,394 tons in 1905; tin plates, 16,159 tons in 1906 and 17,449 tons in 1905; tubes, pipes, etc., 20,873 tons in 1906 and 17,360 tons in 1905; nails, screws and rivets, 3,235 tons in 1906 and 2,423 tons in 1905. Exports of machinery from England to Australia(exclusive of electrical machinery, increased from $3,341,975 in 1905 to $4,546,123 in 1906.

He does not give the figures especially for the United States, which are said to be steadily advancing. However, our exports of iron, steel and copper goods have been comparatively light, by reason of the unusual home demand. It keeps our factories running up to capacity to supply the demands of our own country, and capacity is being increased as fast as our manufacturers can bring it about.

The growing demand for structural steel and copper goods is very great all over the world. Of course, it is greatest in North America, because that is comparatively new country and growing more rapidly than any other part of the world.

The United States is building more railroads, stringing more copper wire, putting up more steel structures and using more of the metalliferous products of the earth than any other country. It indicates the country's marvelous growth, the rapid development of her vast resources and the push and enterprise of her people.

A Great Bar of Gold

The Miner, of Kingman, Arizona, reports the shipment of a gold brick from the Gold Road mine, Mohave county, to Los Angeles, California, to be exhibited during fiesta week in that city. The bar weighed 302½ pounds and was valued at nearly $100,000. It was taken out in a ten days' run of the mill, and every precaution taken to keep it just as it came from the mold. It stood nearly three feet in height and

was conical in shape. The greater part of the ore from which the bar was made was taken from the deepest level of the Gold Road, which is said to be the best ore in the mine. William Baily, who is one of the largest individual owners in the property, accompanied the bullion to Los Angeles and placed it on exhibition. Superintendent S. R. Porter and wife followed the bar to the City of Angels Wednesday evening, where Mr. Porter will give visitors all the information necessary regarding the work of getting out such a massive lump of gold.

We congratulate Billy Baily. He was once a San Juan boy and made a lot of money when he sold his interest in the noted Tomboy mine near Telluride, and was prominently mentioned for governor on the Democratic ticket.

The Difference

Duncan M. Stewart, vice president and general manager of the Sovereign Bank of Canada, discussing the difference between the American and Canadian banking systems, says:

"In the first place there are two kinds of chartered banks in the United States, namely, those operating under state laws and those incorporated under the national banking act. Both may issue notes and conduct a general banking business, but as there is a heavy tax on the circulation of state banks these institutions are practically prohibited from issuing notes. There is only one kind of chartered bank in Canada; we have no state or provincial banks. All banks operate under the Dominion act, the privileges having relinquished their rights to legislate for banking and currency to the federal government at the time of confederation (1867).

"A national bank may commence business on a capital as low as $25,000, the amount being regulated by the population of the place of establishment.

"In Canada the minimum paid-up capital is ten times that amount, namely, $250,000, which must be deposited in gold with the Dominion government before a bank can issue a note or do business of any kind. The incorporators must at the same time lodge with the government a list of bona fide subscriptions for stock in the bank to the extent of not less than $500,000 and as subscribers are liable for double the par value of their subscriptions, the Canadian people have a guarantee of at least $1,000,000—of which they know $250,000 has been paid in cash—before the institution can open its doors for business."

Making Wrought Iron Direct From the Ore

Thomas Blair, Jr., of Woodmere, New York, has patented a process for reducing metallic oxides, and has assigned a one-half interest in his patent to B. C. Lauth of Pittsburg, Pa.

The invention relates to improvements in the process for reducing metalic oxides mixed with gangue, especially iron oxides, whereby wrought iron is economically produced direct from the ore, free from metalloids and ready for use. The process consists in simply removing the oxygen from the metallic oxides mixed with the gangue, by subjecting the same to contact with a reducing gas at a temperature sufficient to produce the required chemical reactions, but with an insufficient supply of free oxygen to consume the reducing agents, changing the reducing temperature to a non-reducing one by supplying more air, thus raising the temperature sufficiently to fuse the gangue or extraneous matter and burn out the metalloids, but not to the extent required to fuse the metal, separating the fused gangue or extraneous matter from the metal by balling while the gangue is being melted away therefrom.

The Kimberly Diamond Mines

With regard to the Kimberley and Du Toit's Pan mines, the Hon. Ernest Schwarz claims that in the Kimberley mines the surface rubble, always sinking as each level is abandoned, has left exposed to view the original hole blown through the solid rock by the volcano. The boundaries thus presented show that the chimney was not excavated by one explosion, but was widened to its final size by successive outbursts; in the south-east corner there is a smaller rounded chimney attached to the main pipe. In the case of the Du Toit's Pan mine there are two pipes quite distinct attached by a neck, while a portion in the eastern neck is so poor in diamonds that it does not pay to work the blue ground, showing that there is a difference in the blue ground, and this difference is maintained in depth.

Welding Copper

Scientists are becoming interested in the discovery of a process for welding copper, said to have been made by a blacksmith of Winnipeg, Canada. It is claimed that the process has been thoroughly tested and found successful. The copper can be welded to copper without impairing the electrical conductivity and other properties of the metal. The process is said to be very simple and no more costly than the welding of steel. The work can be done with a forge, blow pipe, or any other apparatus that will heat the metal to a cherry red. Patents are now pending for the process in Canada, the United States and Europe. It is believed to be the coming great economic factor in the art of manipulating copper.

A Great Pipeline

The Columbia Gas & Electric Company has been awarded the contract for a pipe line to extend from West Virginia to Kentucky and Ohio, a distance of 130 miles. The pipe will cost $5,000,000, and will range in diameter from ten to twenty inches. It is reported that the company has acquired 250,000 acres of gas-producing territory in West Virginia and will proceed to develop it. The National Tube Company has the contract for most of the material. It is proposed to complete it in two years.

Dredge Mining for Gold

Dredging for gold has become an important mining factor in this country. At the beginning of last year there were twenty-six companies operating over fifty dredges of the largest capacity, and the number will be increased this year to at least sixty or sixty-five. These great machines will scour the earth for placer gold wherever the ground is suitable and 10 cents a cubic yard and upwards can be obtained. The rapidity with which they are revolutionizing placer mining may be judged by the increasing production of gold in the last five or six years. In 1902 the value produced amounted to $867,665, while in 1903 it reached $1,475,749; in 1904 it grew to $2,187,038, and in 1905 it increaseed to $3,276,145, increase over the previous year of $1,089,107. The net annual yield per dredge is about $54,675, although for some, of course, the yield is much above this figure. New fields are constantly being prospected, and there are many places known to be fertile in gold which can be made to yield their treasure by the introduction of this new method.

The figures for 1906 have not yet been obtained, but it is believed they will aggregate $4,000,000 in round numbers. So far the present season has been highly favorable, and the output of the dredges in this country for 1907 will probably amount to $4,500,000.

Wolfram and Hubnerite*

By M. Nicolardot.

Owing to the ever-increasing employment of tungsten in metallurgy, wolfram and hubnerite ores have become of very great interest. To be merchantable, they must be concentrated so as to contain at least 60 per cent. of tungstic anhydride and not more than 0.25 per cent. of phosphorus and 0.01 per cent. of sulphur. Practically, the average percentage of tungstic anhydride is above 70 per cent. Electro-magnetic separation enables removal of nearly all the tin, and reduces silica to below 2 per cent. In this state of purity the wolfram can be reduced directly in the electric furnace to prepare ferro-tungsten to be added to molten steel in the crucible. Thus it is useless to work by a long expensive chemical treatment, and one can understand the value of a rapid analytic method which demonstrates, together with the percentage of tungstic anhydride, the nature and proportion of the impurities (silicates, gangue) and, in particular, those of the substances which make steel brittle (sulphur, phosphorus, arsenic, tin). The classic method—fusion with carbonates, attack with aqua regia, transformation into calcium tungstate—is very long, and does not allow of quantitative analysis of all the elements of the mineral.

For more than three years I have utilized a method of analysis which always seemed so simple and easy that I thought it had already been published. However, as I could not find it in any treatise or periodical, I think it deserves description in one of the forms which enables analysis of all the mineral constituents. When only the percentage of some elements is required, some very simple modifications can be made. The roughly-ground ore is heated with an alcohol lamp in a silver crucible with three times its weight of soda or potash. Half the alkali is previously melted to cover the bottom of the crucible. The sample is spread over the coat of cooled alkali, and the rest of the reagent is placed on top of this. In less than a quarter of a minute, as soon as the alkali is melted, the reaction is completed, and all the unatacked residue is removed by washing with tepid water. Nothing adheres to the crucible. The alkaline liquor can be directly filtered with a paper filter or ammonium nitrate. The clear alkaline liquor is oxidized by aid of bromine water, so as to transform the sulphides, sulphites etc., into sulphates; then the liquor is neutralized with nitric acid. When it is neutral, one can continue to acidify with nitric acid or tartaric acid, which prevents the precipitation of the tungstic anhydride in subsequent treatments. Sulphur is then determined in the hot liquor by aid of barium nitrate. The excess of barium is removed with sulphuric acid. In both cases one ascertains that the precipitate of barium sulphate does not retain silica, tungstic acid, niobic or tantalic acids. The acid liquor is evaporated to siccity in a water bath to remove the greater part of the silica. In the case when the silica has a yellow tint it is melted with potassium bisulphate, and the acid solution added to the primitive liquor. It must also be ascertained that the calcined and perfectly white silica does not contain niobic or tantalic acid, by the aid of hydrofluoric acid. The acid liquor is treated with sulphuretted hydrogen; the arsenic, molybdenum (if any) and the tin (when the attack has been prolonged) are precipitated. Very rarely copper and bismuth are found, but the presence of niobic and tantalic acid was observed in all the specimens of wolfram analyzed. These different elements are separated and analyzed by known methods. After filtration, the liquor is mixed with ammonia, and treated with sulphuretted hydrogen. The tungsten is completely transformed into sulphotungstate; the liquor at the same time acquires a dark green tinge, due to the formation of a soluble iron sulphide in alkaline solution. The sulphotungstate is decomposed, with precautions, by aid of hydrochloric acid, and the tungsten separates in the form of a brown sulphate, which is filtered and then washed with diluted nitric acid; finally dried and calcined until yellow. One must ascertain that it does not contain silica. A little iron and phosphorus remain in the solution. They are separated and analyzed by the ordinary processes after elimination of the sulphuretted hydrogen by the concentration in the water bath. A little iron passes into the solution, either because the soda employed always contains binoxide or, in particular, because the wolfram, which is a ferrous tungstate, is more or less oxidized, and contains a little ferric tungstate. In the residue left by the soda there is iron, manganese, cassiterite, and gangue (usually quartz.) This residue is very easily attacked by hydrochloric acid; separation of these various substances presents no difficulty, and can be realized by the classic methods or the one I gave six years ago ("Comptes Rendus," T. cxxxiii., 1901, p. 686.)

This method of analysis also makes it possible to definitely fix the formula for wolfram or hubnerite. Vauquelin first, and then Schaffgotsch, and Wohler himself admitted that wolfram was, partially or totally, a combination of tungsten binoxide with ferric oxide. Ebelman explained their errors, and clearly demonstrated that wolfram is a ferrous tungstate. The process of attack with soda confirms Ebelman's conclusions. The tungsten binoxide is attacked by soda with such slowness that it would be impossible to realize disaggregation of wolfram so rapidly were it not a combination of tungstic acid and ferrous oxide.

*Specially translated for The Mining Journal from Comptes Rendus.

The Cobalt District, Ontario, Canada

A writer who recently visited the Cobalt district gives his impressions to the public in a concise and lucid manner. He declares that for some reason unexplained every effort is being made to keep the facts from the public as to the development of the silver mines of the district. There appears to be an absurd attempt at secrecy. Signs are prominently posted on almost all the shipping propositions warning people against trespassing. The information disseminated by most newspapers and magazine writers is therefore necessarily taken second-handed.

By a stroke of good fortune this article is written from personal observation, every property of importance having been gone over with a mining engineer who after earning his sheep skin was connected with one of the greatest mining combinations the world has known. Personal knowledge, supplemented by such experience, enables the writing of facts.

Notwithstanding all that has been written about the Cobalt district, its richness is neither generally known nor appreciated. There are in the ore houses of the shipping mines today in the neighborhood of 50,000 sacks of ore that will run from $20,000 to $100,000 to the car. There are, as a rule, 400 sacks to the car. In one ore house alone there are now stored 8,000 sacks weighing from 356 to 420 pounds each. These sacks are about twenty-four inches wide by about thirty-six inches long. This will give an idea how much metal is contained in the sacks, and renders more probable, to

the mind of the layman, the seemingly fabulous values given.

Much of the ore coming from one of the mines, and that one not the largest in camp, is so rich in native silver that it cannot be put through the crusher as the silver merely flattens out and clogs the machine. The writer was present when what seemed to be a piece of country rock stopped the crusher and made the belt slip. The engine stopped and the silver had to be cut from the machine.

Stock market prices are no guide to values on any of the shipping mines as they are the subject of manipulation as shameless as any disclosed on Wall street. As speculative issues they should not be touched because the interests controlling the market are too powerful for the ordinary dealer in margins to cope with. Where the capital is within reason the stock of any of the shipping mines might prove a good investment. One thing, however, must be taken into consideration, and that is the management of the mine and the policy of the controlling interest. No matter how rich a property may be, mismanagement or dishonesty may make the investment unsafe. All other things equal, one cannot go far wrong on any of the shipping mines.

Incompetency, crazy scratching on the surface, the taking out of the silver just because it can be reached, without further exploration or intelligent mining, are being superseded by systematic work on a scientific basis. In other words, genuine mining is now going on at all of the principal properties. Order is being brought out of chaos, and from the confusion is being evolved an intelligent idea of the depth and breadth of the field.

Veins located are watched as to their trend; shafts are being sunk and crosscutting and drifting are under way with a success that has surprised and pleased the owners of the properties.

While the geological formation is unlike that heretofore encountered and is tantalizingly irregular, the doubt as to the permancency of the camp is being dissipated. One shaft is down 278 feet and is still in ore. At another point on the same property diamond drill exploration has been made to the depth of 500 feet. The result of that exploration has been kept secret, but it is known that since the examination the owners of the property have refused $5,000,000 cash for it. One other property has cleared 800 acres, piled its cordwood to have as a reserve for fuel in case of coal shortage, and has uncovered fifty-nine veins of silver. Shafts are sunk on fourteen. There are no expensive surface equipments, buildings, etc.; the money spent is mostly beneath the surface and is bringing rich returns.

It is estimated that in the first flush of development the miners carried away in their pockets when they left the mines in the Cobalt field from $1,000 to $4,000 a day in native silver. This is now being stopped. Change houses are being erected with lockers for the men. When a shift goes below they must not do so in the clothes they wear outside, and when they come up they are compelled to change their mine clothes in front of an inspector.

Owing to the distance the ore must be shipped for treatment—New Jersey—only the richest of it is being sent forward, and the dumps, when the tailings are worked over, will yield good silver values. The ores are refractory. Mingled in them are silver, nickle, cobalt and arsenic. Cobalt is used chiefly for coloring glass and fine china and pottery. It is also used in making paints and pigments, and may be utilized the same as nickle in temering steel, and retails for $2.50 a pound. Its bloom is quite common, and the purplish stain can be seen on the rocks through which the railroad cuts its way. It was this cutting by the Ontario government when it built the Temaskaming & Northern Ontario that first revealed the silver.

At a conservative estimate there is now sacked and awaiting shipment nearly $4,000,000 worth of ore.

Mining engineers on the field attribute the low price of stock to two things: One is a desire to keep prices under until the floating supply of stock in the shipping companies is corralled, and the other is the skepticism and lack of knowledge of Cobalt on the part of the general public.

From the explorations made, not by the ordinary prospector but by mining engineers of ability, there is no doubt that the silver belt extends west nearly 100 miles into the Montreal river district. Now that the ice is moving further explorations will be made in this direction. Men who are conservative and not much given to talking unhesitatingly say they believe that when this district is opened up it will equal if not excel Cobalt for richness. The Temagami forest reserve is also being explored and favorable indications found.

Larder Lake gold flotations should be cautiously regarded until the value of the territory is demonstrated. It is largely staked with claims, but they are what are termed "snowshoe claims," located when there was four feet of snow on the ground, so that no indications save the out-cropping of some uncovered bluff could be seen. So far there has not been a single mining claim granted, no patents awarded, nothing but applications filed. The Ontario government is as yet undecided as to whether it will demand an inspection before granting patents or working permits. If it decides upon inspection it is probable a great many applications will be thrown out. Until this is settled and the work of demonstration further along Larder Lake flotations are good things to steer clear of. There may be gold there, but if there is it has not been sufficiently demonstrated to warrant the formation of mining companies. It is believed that gold will be found in the Lake Abitibi district, and prospectors are now going in there.

In tunneling with the aid of compressed air, which assists to prevent the inflow of the fluid or semi-fluid earth, the risk to life or injury to health in pressures up to 35 lbs. per sq. in. is practically nil, provided certain precautions are taken. These are: (1) The exclusion of men not in good physical condition, especially when suffering from heart or lung troubles or catarrhal affection of the head; (2) efficient ventilation of the tunnel, particularly where men are at work; (3) provision of warm clothing and warm quarters for the men on leaving the tunnel, and, in general, the avoidance of chills; (4) the careful observation by the men of all the ordinary rules of health.

The coinage of the United States mints for May was as follows: Double eagles, $3,585,000; eagles, $3,623,360; total gold, $7,208,360. Half dollars, $61,000; quarter dollars, $524,000; dimes, $431,500; total silver, $1,016,500. Five-cent nickels, $238,550. Total coinage, $8,463,410. In addition there were coined $1,728,000 pesos, 30,000 20-centavos, and 66,000 10-centavos for the Philippines, and 1,800,000 50-centavos for Mexico.

The director says all the mints are being worked up to capacity and there is talk of creating more.

Three great companies own almost all of the Douglas Island district of Alaska, the Treadwell, the Alaska and the Mexican Gold Mining companies. They not only own the mines but the stores, boarding houses, amusement places, and directly and indirectly support a population of 15,000 people. These great companies give out very little information to the public. Their stocks are not quoted on the markets. They are close corporations, very conservative and immensely rich.

Production of Platinum*

(By F. W. Horton.)

The year 1905 saw a phenomenal rise in the price of platinum and a greatly increased production in the United States. The annual report of the United States Geological Survey on the production of platinum, shows that early in March 1905, the price of ingot platinum advanced from $19.50 an ounce to $21 an ounce, surpassing gold in value. On April 1, 1905, the price fell to $20.50, and remained firm at this quotation until February 1, 1906, when it jumped to $25 an ounce, where it remained until September 1, or about six weeks ago, when it leaped to the unprecedented value of $34 an ounce. The production of platinum in the United States increased from 200 ounces in 1904 to 318 ounces in 1905.

The rise in the price of platinum and its increased production in this country may be ascribed to two causes; the growing demand for the metal and the reduced yield of the Russian platinum placers, which usually furnish about 90 per cent of the world's supply.

The anxiety felt by the platinum dealers during the Japanese-Russian war has not abated since the settlement of international difficulties, but has rather increased as Russia's eternal dissensions have developed. Even before the uprisings, it is said, the large Russian mines were purposely curtailing their production. This reduction of the output is due to the fact that the entire product for a varying term of years was bought up under contract and at prices that now seem ridiculously low. As the mine owners receive only the fixed price, they do not participate in any gain due to rise in value, and are therefore not desirous of a large production, but are husbanding the limited resources of their mines until such time as they can dispose of their product to better advantage. Meanwhile the small mines, which, generally speaking, are not hampered by such agreements, are working to their full capacity to take advantage of the stimulated prices; but their entire output is only a small percentage of what is usually produced. A greatly increased consumption of platinum in the electrical and chemical industries, together with this stringency of supply, accounts for the prevailing high prices.

The exhaustive tests and examinations of black sands commenced early in 1905 in connection with the Lewis and Clark Exposition, and still being carried on at Portland, Oregon, by the United States Geological Survey, have done much toward placing platinum mining in this country upon a stable footing and developing it into a permanent and profitable industry. Not only have many discoveries of platinum in new localities been made, but the tests have revealed the fact that there are in this country districts which contain surprising quantities of platinum, and they have also given much valuable data as to the best method of obtaining it.

Platinum is now known to exist in fifteen counties in California: Butte, Calaveras, Del Norte, Humboldt, Mendocino, Nevada, Placer, Plumas, Santa Barbara, San Luis Obispo, San Bernardino, Shasta, Siskiyou, Trinity and Yuba; in nine counties in Oregon: Baker, Coos, Curry, Douglas, Jackson, Josephine, Lincoln, Linn and Union; in eight counties in Idaho: Ada, Bingham, Boise, Elmore, Idaho, Nez Perces, Oneida and Shoshone; in four counties in Colorado: Chaffee, Park, Saguache and San Miguel; in three counties in Washington: King, Skagit and Whatcom; in two counties in Montana: Custer and Granite; in Utah, in Garfield county; in Arizona, in Yavapai county; and in Wyoming, in Albany county. The metal is also rarely found in Alaska and in the gold-bearing sands of Corozal river, Porto Rico. Isolated occurrences of single nuggets or mere traces of the metal have been found in many other counties of these states, as well as in four of the eastern states, namely, New York, Pennsylvani, North Carolina and Georgia. In many of these localities the metal occurs but sparingly. The most promising fields are in the counties of Southern Oregon and Northern California. Here the metal has been found in commercial quantities. With proper methods a considerable annual output should be obtained.

The platinum metals are usually found in working gold placers, especially where the gravels are derived from peridotites. Many managers of placer mines have been convinced for a long time that it would pay to save the platinum in gravels, if it could be done by some inexpensive method. The experiments of the Geological Survey which were conducted under the supervision of Dr. David T. Day, have shown conclusively that 95 per cent. to 98 per cent. of the precious metals, both gold and platinum, contained in the sluice box sands can be saved on concentrating tables of the Pinder or Wilfley type, such as are used in every day practice; and that in most cases the concentrates thus obtained will represent less than one per cent. of the total weight of sand fed to the table.

Besides discussing the experiments made in the recovery of platinum in this country, Mr. Horton describes the methods of extraction in vogue in Russia. He also reviews the localities in which platinum-bearing gravels have been noted in Russia, Colombia, British Columbia and other countries, describes the physical properties of platinum and its associated metals, and sets forth their uses. A brief bibliography of platinum, with which the report closes, is not its least valuable feature.

It should be noted that the imports for 1904 show an increase in value of $204,108. Considering the increased demand for platinum, the gain in importation is slight, but if the high price and scarcity of the metal be taken into account the wonder is that there was not a large decrease in the quantity imported.

*From Advance Sheets, Mineral Resources of the U. S.

OCEAN ISLAND PHOSPHATE INDUSTRY.

Inclement weather has had an unfavorable effect on mining and transportation of phosphate on Ocean Island, which last year shipped 108,615 long tons. In recent months, however, better luck has been reported by the Pacific Phosphate Company, which controls the deposits, and which in June a year ago obtained a twenty years' concession from the Mexican government to extract guano from Clipperton Island. Much money has already been spent for buildings, etc., on this island. The company has also made a contract with the Jaluit Gesellschaft, which has a ninety-four years' lease (from April 1, 1906) on the phosphate deposits on Pleasant and other islands in the German protectorate of the Marshall group of islands. The Pacific Phosphate Company has made preparations to ship the high grade product from Pleasant Island, the necessary funds being raised by a £60,000 ($300,000) five per cent. mortgage loan. Last year the company paid a seven per cent.)$43,750) dividend on its preferred stock and a fifteen per cent. ($83,750) dividend on the ordinary shares; has written off for depreciation of the island buildings and plant, etc., fifteen per cent., as usual, and brought forward $66,714, making the surplus at the end of year $215,151.

Canadian Graphite

By H. P. H. Brumell.*

Already there are several companies busily at work with the expectation of producing considerable quantities of graphite during the present year. Unfortunately with regard to the higher grade of graphite (the so-called flake or crystalline quality), the business becomes a milling rather than a mining one, as the ore is usually a disseminated one requiring expert knowledge and speceial machinery. In the latter respect careful experiment has been required, and the present apparent success has only been won by large expenditure of both time and money.

The industry, which dates back to about 1860, has until very recently not been successful in Canada, although with leaner ores it has been profitably conducted in the United States for many years, notably by the Joseph Dixon Crucible Company, the pioneers, on this continent, in the production of graphite from low percentage ores. They began operations as early as 1827.

In an ore mined at Calabogie, Ont., the foreign substance is almost invariably one or other, as yet undertermined, of the chlorite group. For commercial purposes the mineral may be divided into three groups, namely: Anthracite, amorphous, and crystalline, the last being again divided into "vein" and "disseminated" ores. Of the anthracitic variety there is a comparatively large deposit near Lepreau harbor, on the Bay of Fundy, N. B., while the amorphous is found at a number of points in Nova Scotia, New Brunswick and Ontario. The last and most important variety is found, in commercial quantities, to a very great extent, in the Archaean rocks lying to the north of the Ottawa river, and to a smaller extent in these rocks in eastern Ontario. Although widely distributed over large areas of both these provinces, the most important deposits in Quebec are confined to the counties of Labelle and Argenteuil, while in Ontario the counties of Lanark and Renfrew show considerable development.

As to the relative value of disseminated and vein ores, the writer has always held that the advantage has lain with the former variety by reason of its uniform character and continuity of deposit. Experience in the mining of both has proved this.

Speaking generally, the only deposits of value are confined to rocks of pre-Cambrian age, the mineral being found usually in the Grenville series, or upper beds of the Laurential system. Certain less important deposits of amorphous ore are occasionally met with in rocks of Devonian or lower Carboniferous age.

In the limestones, as at Grenville and Calumet, the mineral occurs invariably, as segregated masses rather than in veins.

The mill of the North American Graphite Company was built on lot 28, range 6, township of Buckingham, in 1895, and in 1904 the mill of the late Walker Mining Company was entirely remodeled by the Buckingham Graphite Company. In Ontario the mill of the Ontario Graphite Company was erected in 1902, and continued in operation for about a year, when a cave-in of the roof under Whitefish lake flooded the mine and all work was abandoned. In the same year the Globe Refining Company erected a small mill at Port Elmsley, which is in operation, though not financially successful, it is said, at the present time.

Two mills are at present being erected, one near Calumet station, on the Canadian Pacific railway and another on the Lievre river, about six miles north of Buckingham, while extensive development work is being carried on at the Belle mine, about three miles east of Buckingham. Rumor says that a mill will be erected on this property during the coming spring.

Crude ore has been, in the past few years, shipped from several points in Canada, the most important producers being the Ontario Graphite Company, which exported large quantities of amorphous ores, from its mine in Brougham township, Ontario, previous to the flooding of the pit. Large quantities of a poorer quality of amorphous ore were shipped from Allanhurst, in Ontario, and from St. John and Petitcodiac, in New Brunswick, while a considerable shipment of flake or crystalline graphite was made from Grenville, Quebec, by the Keystone Graphite Company in 1900.

Speaking generally of the earlier efforts at milling, it may be said that in all instances the operators used the old system of stamping; in point of fact, with the exception of the Pew & Weart mill, all mills were so equipped until 1902, when the first dry mill was erected by the Globe Refining Company at Port Elmsley, Ontario. This company was followed, in 1903, by the Anglo-Canadian Graph Syndicate of Birmingham, Engla which took over the mill erected the North American Graphite Co pany and rebuilt it on a dry princip different, however, to that of t Globe company.

In the earlier mills, after crushi and stamping, concentration was h by stationary buddles, and, in so of the earliest plants, by keeves. T concentrates, after drying, were p through a system of buhrstones a revolving screens, until they we more or less finished, the resulta products being then graded for va ous markets.

At the mill of the Globe Refini Company, while the writer has n personal knowledge, concentration had, after crushing and rolling the o by means of the Krom separator pneumatic jig, after which the co centrates are bolted and only t grades made, all material finer th 60-mesh being discarded.

The plant erected by the Ontar Graphite Company in Brougham tow ship, Ontario, is equipped with t old, and now obsolete, system stamps and buddles; a treatment which the ore does not readily le itself. This ore is unique, inasmu as it is practically amorphous, carr ing about 10 per cent. of crypto-cry talline or flake graphite, and becau both varieties are similar in gravit a very poor separation is made. the crushed and buddled ore had be dried after the so-called concentr tion, and all the material in the bu dles moved by hand, it will be u derstood that considerable extra e pense was saddled on the finish product.

The mill of the late Anglo-Canadi Graphite Syndicate, formerly t North American Graphite Compan now contains Blake and roll-ja crushers, between which the ore dried by means of a cylindrical revol ing fuel drier. After coming from t roll-jaw crusher, the ore pass through two sets of ordinary belte rolls, passing thence to a series sizing screen, fitting it for the d pneumatic concentrators. The tailin from these machines are then treat on the Brumell concentrator, a w separator which relies on the floati quantity of graphite, when dry, upo the moving surface of a body of wate The resultant concentrates from th wet separator are then dried by mea of a revolving steam drier, when a concentrates are taken to the buh stones, by means of which, with t neceessary accompanying screens a graders, the material is finished a ready for market.

*Abstract of paper read at Toronto meeting, March, 1907, of the Can. Mg. Institute.

The mill of the Buckingham Graphite Company is equipped similarly to the foregoing, though its capacity is very much greater. In this mill the roll-jaw is replaced by a Gates rotary crusher, and, in addition, a dry separator, known as the barrel concentrator, is used.

In regard to the mills being erected at Calumet and Buckingham great secrecy has been observed, and it is only from hearsay that the writer is led to say that the methods to be employed will be practically the same as are now used at Port Elmsley, Ontario.

Increasing Output of Gold

Director of the Mint George E. Roberts recently stated that he considered Nevada likely to show greater increases in gold production for the next few years than any other equal area of the earth. He figures the production of that state for the present year at $15,000,000, fifty per cent. more than last year.

"Our report on the production of gold for the United States in 1906, which is now being compiled," he said, "but will not be out for six months, will show a production for Nevada of approximately $10,000,000, as against $5,359,100 last year.

"But last year's figures do not do justice to present production, which is at the rate at least one-half greater. I feel certain that Nevada in 1907 will produce at least $15,000,000 in gold, and will rank close to Alaska, Colorado and California in gold output.

"The gold mining industry of Nevada, as it exists to-day, at places like Goldfield, Tonopah and Rhyolite, is only in its infancy. There is evidently almost a limitless amount of gold under the desert floor of this state.

"The gold production of the United States in 1906 was about $96,000,000, as against $88,180,700 in 1905. I believe that in 1907, thanks chiefly to the increase in Nevada, the production will be above $100,000,000. Such gains in gold production are the financial salvation of this country. Had it not been for the enormous increase in our gold supply, enabling a large, safe expansion of credits, we would have had a serious business reaction long ago."

Anthracite coal shipments from Pennsylvania in April amounted to 5,916,583 long tons, making a total of 20,966,063 tons for the four months this year, which compares with 16,455,553 tons in 1906, showing an increase of 4,510,510 tons, or 27.4 per cent.

Supplies for Engineering Trips

By William Newbrough.*

I furnish below a copy of my list of supplies for an engineering trip. I keep this list in my card index and when starting glance through it and take with me the ones desired. Some of the articles may seem peculiar, as for instance, guns and fishing rods, but frequently when going into a game country they come in handy.

After looking over this list be the trip for one day or three months, I rest assured I have forgotten nothing. Certain articles may, of course, be omitted or added in accordance with individual ideas or requirements.

Bed.—Blankets, quilts, pillow, cover, bedrope.

Clothes.—Buttons, cap, collar buttons, comb, chamois underclothes, cuffs, collars, gloves, handkerchiefs, German socks, German sock overshoes, muffler, mosquito netting, needles, neckties, overalls, overcoats, overshoes, shirts, shooting coat, shoes, soap, socks, suits, smoked glasses, thread, underclothes, towels, hair brush.

Camp Outfit.—Axe, axle grease, bailing wire, butcher knifes, clevises, cups, collar pads, dish rags, Dutch ovens, dish pans, forks, grindstone, gunny sacks, hammer, hatchet, hay, horse blankets, harness, harness tools, halters, large forks, large spoons, knives, meat saw, monkey wrench, plates, pots, rope, spoons, stove, soap, tin buckets, kettles, towels, seamless sacks, skillets, tents, water jug, water bucket, wagon cover, wash basins, whips, saddles, saw, straps, wagons, horseshoes, pincers, rasps, pick, shovel, bar.

Instruments.—Adjusting pins, transit, plumb bobs, plumb bob string, transit, wrench, magnifying glass, tripod, solar, field glasses, hand level, level tripod, rod, stadia rods, targets, target springs, chain, steel tapes, linen tapes, pins, cold chisels, timber scribes, carpenters' pencils, chalk, tally boards, tally counters, pedometer, stone hammer, thermometer, barometer, spring balance, compass, compass tripod, pocket compass.

Stationery, Books, Etc.—Henck, traverse tables, Trautwine, Searle, Shenck, Coal and Metal Miners' Handbook, Hodgman, Kent Kidder, new note-books, old note-books, maps, blueprints, thumb-tacks, india ink, erasers, water colors, colored pencils, drawing pens, paper, profile paper, tracing cloth, blue-print paper, crow-quill pens, writing pens, note paper, dividers, compasses, rectangular protractors, pencils, emery cloth, envelopes, postage stamps, triangles, straight edge, colored inks, stylographic pen, ephemeris (diary), scales.

Photography.—Camera, tripod, roll-holder, plates, plate-holders, dust brush, focus cloth.

Provisions.—Flour, sugar, baking powder, coffee, tea, condensed milk, potatoes, tomatoes, corn, canned peas, canned pork and beans, canned fruit, cheese, butter, bread, eggs, ham, bacon, salt side, fresh meat, onions, pickles, canned jam, syrup, sardines, canned meats, canned salmon, fresh fruit, salt, pepper, mustard, cabbage, carrots, beets, oatmeal, sweet potatoes, squash, vinegar, matches.

Sundries.—Shot gun, shells and rod, rifle shells, and rod; fishing rod, reel fly-hooks, flies, leader box, fishing shoes, waders; money, check book, tobacco, cigars, pipes, matches, quinine, alcohol, hypodermic syringe, pills, cascarets, glycerine.

*From Sch. of Mines Quar., April, 1907.

THE PRODUCTION OF FLUORSPAR

The total production of fluorspar in 1905, as reported by Edmund Otis Hovey of the United States geological survey, was 57,385 short tons, valued at $362,488, most of which came from Illinois and Kentucky. This is an increase of 20,933 tons, $127,733, as compared with 36,452 tons, $234,755, in 1904. The production, furthermore, is greater than ever before, surpassing the previous record year, 1902, by 9,367 tons, $90,656. The companies report such active demand for fluorspar, particularly for use in open-hearth steel furnaces, that the production for 1906 is likely to exceed greatly that for 1905. The operators in Illinois and Kentucky are seriously hampered in working their mines by the difficulty of getting reliable and competent workmen. The Illinois production amounted to 33,275 tons, valued at $220,206, an increase of 16,070 tons, $98,034, over the production of 17,205 tons, $122,172, in 1904. Kentucky has fallen to second place, the output in 1905 being 22,694 tons, $132,362. This, however, is an increase of 3,598 tons, $20,863, as compared with 19,096 tons, $111,499, in 1904. In Tennessee, 25 tons of fluorspar were mined, but not sold.

According to the Board of Trade Journal, February 7, 1907, a company has been formed to work the iron sand found in extensive deposits on the Japanese coast. The iron sand contains no sulphur nor phosphorus. The deposit to be worked lies between Muroran and Hakodate; in some places it is forty-five miles in length, 1,800 feet wide, and four to ten feet deep.

Mining News from the Many Camps

ARIZONA

(Special Correspondence.)

Wickenburg.—Mrs. L. E. Warner, a mining engineer of Los Angeles, has been looking over the surrounding country for mining properties, and incidentally acquainting herself with the characteristics of this section.

She visited all through the country from Bill Williams river to Harqua Hala and saw many promising properties. She speaks very highly of the Harqua Hala and Hercules mines.

Mrs. Warner stands alone in her class as a mining engineer and does not promote mining companies or sell stock. She examines mines and passes her opinion to headquarters, and, it is said, her favorable opinion usually results in a deal.

The Copperfield people have 103 claims and will establish five or six camps next fall. One of their new camps has recently been established at the Greenstone claim. A shaft has been started on this claim and so far is showing some good copper ore. They have divided the 103 claims into groups named as follows: Manganese, Yellowstone, Black Giant, Columbia, Golden Arrow, Greenstone, Copper Bell, Copper King, Billy H, and Sterling. It is the intention of the company to establish a camp at each group next fall and a strong force of men will be put to work on each claim. There will be a lively town out there this coming winter.

The Houston-Arizona Copper Company, which owns a group of twenty claims situated thirteen miles east of this city, has increased the original holdings of the property by a purchase survey of twenty additional claims. The property now stretches along the mineral belt for two miles.

Bisbee.—Although rumors have been current about the streets for several days to the effect that S. W. Clawson, for years past mine superintendent for the Copper Queen Consolidated Mining Company, had tendered his resignation, the first official information of the report was obtained from the gentleman himself recently. After twenty-three years in the service of the big company, Mr. Clawson will, on the first of September, sever his connection, and move to Los Angeles, where in the future he expects to devote himself to some private business.

Kelvin.—Philip Wiseman, superintendent of the Ray and Gila Copper Companies, says he is now working forces of men not only at the mine but in the repair of the narrow gauge railroad and in the remodeling of the mill. Altogether about 350 men are now employed. The forces are being constantly increased and operations broadened.

The 200-ton concentrator now being installed at Kelvin by the Ray Copper Company will be treating ore within the next sixty days.

Tombstone.—One of the biggest mining deals that has been consummated in Tombstone for a long time was closed recently with Minnesota people through Pickett & Bowman of this city for a copper property in the state of Sonora. The property is said to have one of the biggest surface showings in the state of Sonora, near Hermosillo, and was experted about a month ago by Mr. Loranger, a mining expert of Duluth, and upon his report the property was bonded for $200,000.

Mr. Loranger is a mining man of more than thirty years' experience, and so conservative that, when he examines a property, no other expert is sent to review his work. It is expected by those who know the property that it will develop into one of the biggest copper mines in the state of Sonora.

The Minnesota people left Tombstone for Sonora to begin work on the property.

Prescott.—For the first time in seven years the famous Crown King mine in the Bradshaw mountains, is being operated in a practical manner. Of more importance, however, is the welfare of the property to be considered in the future by the elimination of those evils linked to incessant litigation and corporate dissension, all of which are now wiped out.

Although but a few months have elapsed since the plans of the management were consummated, sufficient exploitation has been given the property to warrant the statement that the old producer is just as attractive from a mineral standpoint as ever before and if development is any criterion to go by the results are more than gratifying and place the property in the line of the most valuable proposition in this region.

An important mining deal was consummated here recently, when the title to the Starlight group of mines in the Weaver district passed from D. B. Genung and H. L. Scott into the control of W. F. Whitney of Wallingford, Conn. The consideration named in the transfer is $25,000, to be paid in installments within the next twelve months.

The property is considered one of the best prospects for a gold mine in the range, but its development has been retarded on account of its isolation from railroad transportation, making its operation too expensive for the means at the command of the owners.

Yuma.—E. A. Haggott, the Prescott mining man, has made another important mining deal, to a Los Angeles capitalist. E. T. Stimson, a well known millionaire of the Angel City has secured a sixth interest in sixty-six claims in the Ellsworth district. Twenty-two claims are known as the White Steamer group, twenty as the South Cholla, twenty-one as the North Cholla and four as the Fennor-Haggott group.

Mr. Haggott is doing a great deal toward introducing moneyed men to the possibilities in the northern part of the county, and it was through his influence that a large party of Los Angeles capitalists recently made an overland trip in autos from Los Angeles to Salome and return.

The 160-foot shaft known as the Ainsworth, is to be sunk in double compartments to a depth of 700 feet. The work of sinking has already begun.

This means mining for copper. The zinc-lead ore veins are merely a capping, below which the ore is mostly copper, without penalty contents. This demonstration has been made in several shafts, the most extensive of which has a depth slightly under 200 feet.

A shaft 700 feet in depth would be hailed with delight in this district although one of 1,000 feet would be still more acceptable. Some argue, however, that large bodies of ore will be developed in the foothills (the Cochise is in the foothill belt) at the shallower depth than elsewhere in the district. The deepest shaft in the Planet, on the San Simon (formerly the Chiricahua)—455 feet.

A 100-ton dry concentrator is still in operation on the ground, treating the lead-zinc ore.

Kingman.—Miss Flora McDonald of Butte, Montana, made an examination of mining property at Castenada Well recently. Miss McDonald is in close touch with many of the big mining operators of Montana and is on the lookout for copper property for those interests. She has been in all the big mining camps of the west and is thoroughly familiar with copper ores.

H. R. Moore, who was here recently, stated that the Benedictine Mining

and Milling Company, operating in the Cedar Valley district, has just completed the installation of a mill having a capacity of 150 tons per day, which it will start on a steady run as soon as its motor cars ordered, to be used in transporting the ores from its various mines to the mill, arrive.

One of the curiosities of mining is to be seen at the San Francisco mine, Cedar, where in running a drill ahead in one of the drifts on the 600 level a body of water was encountered that has been diverted by pipe to the surface, where it is flowing into a large tank and is supplying the mill with sufficient water for all purposes. The pressure at the lower level is 200 pounds to the square inch.

Jerome.—At the Verde Grande, Superintendent Scott is placing new and powerful hoisting machinery in position, and expects to have it in operation by uly 10th.

Smelter Superintendent Thomas Taylor has three shifts of men driving the Eureka tunnel. Those who visited the property recently express the belief that a little work will make it a great mine.

The machinery for the Mazatzal Copper Company has been shipped from Los Angeles and will reach the mine by way of Flagstaff. Favorable reports are being received from the property daily.

Clifton.—The men at work in the tunnel on the Colorado mine have run into a large body of twelve per cent copper ore, which they are taking out and sacking, ready to be hauled to Cumaripa as soon as the railroad shall be completed to that point, which will be early in August. The ore will go to the El Paso smelter. By November the road will reach Realito, within a mile of the vast ore deposits from where the company expects to be able to ship two to five car loads a day until it shall have accumulated funds enough to erect a smelter of its own.

The Realito is turning out to be a grass roots proposition, and the company has suspended further sales of its treasury stock.

Globe.—Negotiations have been completed for the sale of eleven claims at the head of Pinto creek for the sum of $120,000. Frank Westbrook, John Whelan and Bud Henderson are the owners of the claims. The names of the purchasers have as yet not been divulged, but are said to be a group of eastern capitalists. The claims are splendidly located near the famous Gibson mine.

COLORADO

CLEAR CREEK COUNTY

Reports from Georgetown this week state that the Snow Drift mine on Republican mountain was sold by J. M. Copeland and Mayor H. L. Roberts of Idaho Springs, to Dr. C. S. Black of Nashville, Tennessee, representing the Snow Drift Mining and Milling Company. The consideration is said to be $50,000.

The Snow Drift was the eleventh patented claim in Colorado, the patent having been issued in the early 60's. It has the distinction of having produced the highest grade ore ever mined in this country, having opened a vein which brought returns of 15,000 ounces of silver to the ton. During the early history of the operations the ore was brought to Georgetown and transported to Denver by wagon, then shipped to Wales for treatment.

The ore from this mine secured the first prize for silver lead at the Centennial exposition held in Philadelphia in 1876. The new purchasers will at once inaugurate a large campaign of development throughout the various workings. It is quite likely that arrangements will be made for the prosecution of operations through the Ashby tunnel, owned by the Pay Rock Company.

"The writer was assistant centennial commissioner for Colorado, and remembers the wonderful Snow Drift ore in her exhibit. At that time it was thought these mountains were made of silver.

The power house of the Capital Mining Company is about completed and air will be furnished for tunnel work about the middle of the month. Attention will then be turned to the construction of a concentrating plant to treat the large accumulations of superior mill dirt that have been exposed in the mine.

The tunnel penetrates Griffith mountain for nearly a mile from its portal and has intersected a number of promising veins that will be thoroughly exploited as soon as air can be furnished. The smelting ore is of good grade, milling over two and one-half ounces in gold per ton, besides the lead, iron and silver values, while the concentrating material, which measures nearly twelve feet in width, will concentrate four tons into one of nearly as good grade.

John A. Holmberg of Denver, secured possession of the Bellevue-Hudson, a few months ago, and is now pushing on the work in good shape. Within thirty days Mr. Holmberg expects to install compressor plants, electric power and other equipment. The power will be secured from the Two American Sisters Company and an energetic system of development is being carried forward. A number of lessees are at work and in two instances large bodies of good grade ore are showing. The ground being operated by A. D. Bryant & Company, is still showing strong in ore reserves of a high grade and regular weekly shipments are being maintained. The entire product is being run in one class, the returns varying from 225 to 275 ounces in silver to the ton. The property is located in close proximity to the American Sisters and Jo Reynolds both of which have produced millions and are outputting heavily at the present time.

The Courier says the strike made in the Sidney tunnel last week has created considerable excitement in the Georgetown district. Assay tests of the ore show values of 209 ounces of silver to the ton, 72½ per cent. in lead, .03 gold, or a gross value of $193.68 to the ton.

With the uncovering of large and rich bodies of ore in the Pendlton mountain section, (East Argentine) mining will be given an impetus. That locality has long remained neglected, owing to the deep slide, but it is now evident that miners and operators will proceed to turn their attention in that direction. The strike was made at a vertical depth of about 1,000 feet and about 2,125 feet from the portal of the tunnel, thus proving beyond any possibility of a doubt that the ore shoots will be found at an enormous depth.

That the holdings of the Capital Prize Mining Company will in the near future be entered among the big paying propositions of Clear Creek county can no longer be disputed. A shipment of sixty tons of ore taken from the Aetna lode was made recently and by concentrating seven to eight tons into one, returns of 14 ounces in gold to the ton were received for the finished product. With the construction of a company mill even better results will be attained, as the machinery to be installed will be of the latest pattern and constructed upon lines which will effect the highest saving of values. The shipment referred to above and which was made to the Santiago mill, contained a considerable amount of rock, as in cleaning out the drifts of the Aetna vein no attempt was made to keep the ore separate.

Work upon the power plant building is progressing satisfactorily and a

good force of men is finding employment. The structure is being rushed to completion, as Manager William M. Cooper is desirous of having everything in readiness for the furnishing of air for the tunnel at as early a date as possible. At that time a big force of men will be put to work in the running of drifts upon a number of veins which have been intersected during the progress of driving the bore.

An enlarged campaign of development is to be put under way upon the Terrible-Dunderberg holdings situated on Brown mountain. During the past week Charles C. Whiting of New York, president of the Whiting Mining and Milling Company, was in camp, at which time plans were perfected for extensive operations. Drifting is to be inaugurated upon the 11th, 12th, 13th and 14th levels, so it should not be a great while until this old producer should again be outputting heavily of the precious metals.

On the 11th level the ground was opened to the east some months ago for about 300 feet and for almost the entire distance a large streak of good grade ore was followed. It is now the purpose of the management to continue running the drift, while at the same time stoping will be started. It is believed that by raising a number of rich pockets will be uncovered, as directly above some of the highest grade ore ever found in the mine was extracted. By continuing the drift a large block of virgin ground will be opened for exploitation and the prospects are bright for discoveries of an important nature being made. Drifting will also be prosecuted westerly, as the company controls considerable ground along the course of the vein.

The Scotia-Maine-Phoenix group of claims, which are undergoing development by the Scotia Mines Company, are fast being placed among the list of rich propositions of the Sherman mountain section. During the past few weeks extensive development has been in progress with the result that important discoveries are being made. Only a short time ago a streak of solid ore measuring eight inches in width was encountered in driving the main level forward. Assay tests on the material show values varying 340 to 1,511 ounces in silver, in addition to lead and zinc. The work under way was started where the big porphyry dike was encountered a number of years ago, or just previous to the suspension of work upon the property. Nine levels were driven to this point, and it is evident that the early day operators left a store of the precious metals greatly in excess of the amount that was extracted. It is believed that the shoot just encountered will extend pretty close to surface, as well as downward, and by driving new levels below the present deepest workings the output from these holdings in the years that are to follow will greatly increase the wealth of the land. The company mill, with a capacity of sixty tons daily, is being run on full time and a good quality of concentrates is being turned out. The ore is all rough-jigged, no tables being used in the mill.

The Butler property situated in the Daily district, will shortly be undergoing development on an extensive scale. At a meeting of the stockholders held a short time since a re-organization of the company was perfected and it is now understood that finances will be forthcoming to insure the carrying of all plans to a successful issue. The showing on this property is most encouraging and from past development a number of rich ore bodies have been exposed. In sinking a prospect hole a short time ago a four foot vein of ore was uncovered and assay tests made upon picked samples of the solid material showed values of 3.44 ounces gold and 540 ounces silver to the ton, or a gross value of $430.60 to the ton. The new organization is known as the Butler Mountain Mining Company and the following officers have been elected: President, Judge Luther M. Goddard of Denver; vice president, E. M. Moscript of Idaho Springs; treasurer, J. H. Robeson of Denver; secretary, G. A. Webb of Denver. J. F. Bancroft of Brooklyn, New York, has been selected as manager.

An energetic campaign of development is being carried forward upon the Doric tunnel holdings, including the Magnet property. Since the lease on the tunnel was assigned by the X-Ray Company to C. E. Carpenter and Colonel C. P. Baldwin of Denver, the workings have been cleaned out and and retimbered. The compressor plant is kept in continuous motion and now stoping is in progress on both the Magnet and Sequel lodes. In both instances a fine body of medium grade ore is being followed and a good tonnage is being broken. Owing to the caves which occurred in the stopes it became necessary to perform a considerable amount of dead work, but within the course of a couple of weeks everything will be in readiness for the inauguration of regular shipments. This property will undoubtedly be entered among the list of payers within a comparatively short time, as in a number of places large bodies of low grade ore are showing. With a modern milling plant, built upon lines most adaptable for the treatment of this product, large revenues would unquestionably be realized.

Heavy shipments are being made by B. J. O'Connell, who is operating a block of ground of the Frostberg lode through the Victoria tunnel. During the present week ore haulers have been busy in bringing to market over 100 tons of concentrating ore which brings good returns in silver, lead and zinc after receiving treatment. In addition to this the operator is carrying a stope on a body of heavy lead ore that measures over one foot in width. Recent mill runs had on the product have brought returns averaging $70 to the ton in silver and lead. The ground has been opened for nearly 200 feet in length and there yet remains above over 100 feet to be broken. This lease is fast developing into one of the steady paying propositions of the upper Clear Creek district and during the balance of the year a heavy output will be made. A good force of men is at all times being employed, while machine drills are being used in breaking the rock.

Work is being prosecuted with vigor upon the Mayflower group of four claims located on Russel mountain in the Atlantic district. A crosscut tunnel is being driven to intersect the lodes at good depth, and from surface development it looks as though the holdings would become recognized soon as producers of high grade ore. In driving a tunnel to cut the Mayflower for a distance of thirty feet a foot of solid ore was uncovered, and from assay tests it can be stated that the stuff will mill in the neighborhood of 250 ounces in silver to the ton. This vein will be reached within 200 feet through the new tunnel workings, while the Maud S. will be interesected 800 feet from the portal of the tunnel. From a shoft sunk to a depth of fifty feet on this vein ore was extract which showed assay values of over 2,000 ounces in silver to the ton. nel. From a shaft sunk to a depth of 125 feet will be attained on the Mayflower, while the Maud S. will be cut at a depth of about 700 feet. The depth, as the workings on the Mayworkings on the Mayffower show a depth of only thirty feet from surface. This property is owned by Armstrong Shepard of Georgetown.

GILPIN COUNTY.

Unusual activity is seen in all the camps of this country. Properties are changing hands, capital has put aside its timidity and men are taking hold of these inviting propositions with the

courage born of improved conditions and a brighter outlook. The older mines are doing better than for several years in the recent past, and every few days some new property blossoms out into a shipping mine. Railroads are opening up the remote camps and there is a steadily increasing output of high, medium and low grade ores in all parts of the county. Not in the life of this generation, nor for several generations to come, will these vast treasure vaults become exhausted. They are perennial fountains of mineral wealth.

A short time ago the Mabel Tunnel mining property, located in the lower part of the Russell district, and owned by Charles F. Barker of Middle Park, was sold to the Vigilant Mining & Milling Company, controlled by Denver and Eastern capitalists. The consideration has not been made public, but it is understood the terms are satisfactory to all concerned. The Vigilant company will now install new machinery and push development more extensively.

Edwards & Co., who have a lease on the 555-foot west level of the East Notaway mine, this week received returns from a carload shipment of smelting ore of $280.50 per ton. The values were in gold, silver and copper.

The vein from which the ore is taken varies from one to two feet in width, and shipments of this kind are sent out every three or four weeks.

The Frontenac group of three claims, located in South Willis gulch, Russell district, has been sold to a British syndicate, which will develop and operate the group under the name of the Frontenac Syndicate (Limited), with Henry P. Lowe of Denver as managing director. The consideration is not stated, but is said to have been large. The property has already produced several hundred thousand dollars' worth of ore. The main shaft is 450 feet deep. New electric machinery has been ordered and the group will be exploited upon an extensive scale.

The Yellow Medicine Mining Company, operating properties on the north slope of Colorado hill, has received a large plant of machinery, which will be installed at once in the new shaft house recently erected. Eastern people are interested in this proposition and as soon as the machinery is ready for operation sinking will be commenced and drifting and stoping prosecuted. Excellent surface ore has been taken out of the mine.

A recent assay of a smelting streak in the Ingram mine on Arizona hill shows values of 23.77 per cent. copper, 18.61 ounces silver and .42 ounces gold per ton, or a commercial value of $145.73. The rich streak is from four to ten inches wide and is a good sized body of milling ore alongside the vein.

This property is being operated by Topeka, Kan., people, a number of whom were in the city this week arranging to make extensive improvements in the machinery equipment. A contract is to be awarded for a large hoist and the company is also figuring on the erection of a mill.

Denver people are interested in the Gunnell Hill Gold Mining Company, and they have recently purchased for a consideration of $10,000 the O B Joyful lode claim, situated on the west side of the Masonic cemetery and in the midst of some of the best producing mines in the county. They intend to install a plant of machinery, having already retimbered and fixed up the shaft in first-class shape for regular operations. A new shaft building will also be erected and preparations are being made for liberal developments.

At the Tucker mine, in Quartz valley district, which is being operated by F. W. Hearne & Co., with H. W. Kane as manager, developments are progressing favorably, and the condition of the property is better than it has been for some time past. Good ores have been opened up and the mill is being kept going on ores from the property. Day and night shifts are at work and it is the intention of Manager Kane to increase the capacity of the mill with some additional machinery and tables, which will also add to the efficiency of the plant. The lead concentrates from the mill are being shipped to the Salida smelter, and a switch from the main line of the Gilpin Tramway Company has been completed around from Castle Rock, which makes a saving in the hauling of the concentrates from the mill and in the delivery of coal and supplies to the mine and mill.

Several cars of second grade ore were shipped to the Argo smelter from the Powers mine, in Willis gulch, to-day. The first-class will be shipped in a few days. While drifting in the new level at the 265-foot point a good body of ore was opened that will run high in gold and silver. The streak is from eight inches to two feet wide. The first-class ore from the Powers mine averages from $85 to $100 to the ton.

Jack Sheneman of Bronson, Mich., has been here for the past week making preparations to start the Slide mine, in the Russell district, situated between the Oldtown and the Saratoga. It is an extension of the Lillian vein. The shaft on the property is 100 feet deep and about thirty feet of drifting has been done.

A contract is to be let for sinking and to crosscut for two veins lying sixty-five feet south of the shaft. These will be cut for the purpose of learning which is the mother vein. As soon as this is ascertained a good-sized shafthouse and a heavy plant of machinery will be installed.

A carload of tungsten in the bins of the Tungsten Mining, Milling & Exploration Company is estimated to be worth $1,200. Work is to be pushed on this property on Beaver Creek to the utmost and hoisting plants capable of working to a considerable depth will be installed upon both the Rambler and Tungsten claims.

Local parties are interested in the United States Leasing Company, and they have taken a lease on a large block of ground on the Gregory property. William O. Jenkins is president and W. F. Bishop is manager, and they expect to work on a liberal scale and to be able to make a big showing in the shape of production in the near future.

At the Jupiter-Belmont mine in Russell district, crosscutting work has been faithfully kept up for a distance of 600 feet at a depth of 480 feet for the Jupiter and St. Clair veins, and now a drift to the west has been started from the crosscut on the Jupiter vein. The indications are improving and Superintendent John C. Williams reports that it looks encouraging for the opening up of a body of pay ore. Denver people are chiefly interested, as the Jupiter Leasing & Mining Company, and they have been doing development work for some time past and are entitled to success for their determined efforts to open up a paying property.

CHAFFEE COUNTY.

(Staff Correspondence.)

Salida—Great activity centers about Salida's independent smelter, the Ohio & Colorado Smelting and Refining Company, which is financed from Cleveland. The smelter first started as a pyritic plant with Timothy Goodwin of Leadville as general manager. He was succeeded by John Thomas, as general manager and O. E. Cary, as assistant general manager. Mr. Cary was formerly with the American Smelting and Refining Company, at Salt Lake plant. George Griswold formerly of the Argo plant at Denver was made superintendent. They started with two pyritic furnaces, capacity 1,000 tons, then added four lead furnaces, 200 tons each, then two

more furnaces of 400 tons, which were installed this spring. A copper reverbatory furnace is now being built, of large capacity, for handling copper ores. With this furnace the output of the district will be handled, some of which is being smelted elsewhere. The smelter now has a capacity of 950 tons a day, working about 750 men.

The Garfield Mining, Milling and Smelting Company, recently uncovered shipping ore in their cross-cut tunnel. The property was formerly in charge of J. L. Farrell.

The Uncle Sam Mining & Reduction Company, owning ten patented claims in the Monarch district, have driven two tunnels, one 500 feet and another 150 feet. J. P. McMahon is manager and superintendent.

Murray & Lawson, operating on Bear Creek have driven a tunnel 1,800 feet and expect to strike the mother lode at any moment.

The Vega Consolidated Mining Company, operating on Madonna hill in Monarch district have opened up rich ore in the Fairview claims, assaying high in gold, silver and lead. Ore struck at 362 feet. Forty tons are now ready for shipment. John M. Collins and John L. Farrell are the owners.

The Raymond property will increase their mill capacity to thirty stamps. Mr. Lamont of Denver is superintendent.

The Sedalia mine, operated by the Shawmut Consolidated Copper Company, a Boston company now have their mill in operation, with a capacity of forty tons. G. P. Ewing is in charge of the mill.

The Taylor Company at Garfield, George Purmont, manager, have started to ship copper to Argo and iron to Salida. This property will ship heavily this season.

The Belzora-Basick on Ohio Creek are installing new machinery, compressor, drills, etc.

J. C. Dillon, and party of Dublin, Ireland were visitors in Salida last week, looking over properties with a view of purchasing.

John A. Traylor of the John A. Traylor Machinery Company, Denver, stopped off in Salida last week on his way to Lake City, where he is remodeling a mill.

Mathews Brothers, are driving two tunnels at Chipeta and expect to strike ore soon.

HINSDALE COUNTY.

Mining never looked more promising in this county than it does at the present time. New mines are coming to the front, and older ones that have been idle for years are being revived and put on their feet. The steady producers are increasing their output and all branches of business feel the good effects of these improved conditions.

The Pelican mine, near Lake City, is working twenty-five or thirty men, under the management of A. O. Egbert. They are taking out high-grade ore and making regular shipments.

The Colorado & Indiana Mining & Milling Company, with Guy R. Harkness as manager, has let a contract to A. O. Egbert to drive 240 feet on the vein of the California, west of the Treasure. The California is an end to end extension of the Ute vein, one of the largest producers of lead ores in the state for many years. Power has been installed and machine drills will do the work, before the completion of which the Colorado and Indiana people will begin shipments. This work will carry the drift to a point under the old California shaft, when an upraise for connection will be made.

T. J. O'Donnell, president of the Hidden Treasure Mining & Milling Company, owner with P. C. McCarthy and the estate of J. McCombe of the Hidden Treasure group and mill property on Henson creek, spent the week here in company with a mill man, for the purpose of arranging to have the Hidden Treasure mill rebuilt and extended so that a larger saving can be made in the concentrates. The Treasure is said to have over $1,500,000 worth of ore blocked out and in sight and worlds of unexplored ground. With the replacing of some of the rolls and jigs in the mill and the addition of a canvas plant, the owners believe an adidtional saving of several thousand dollars can be made each month.

One of the most important enterprises, not only for this particular district, but for the whole San Juan country, is the decision of A. E. Reynolds to re-open the Frank Hought mine, on Engineer mountain, at the head of Henson creek. It is twenty-five years since this mine was operated, and all work done in the future will be through new openings. A new shaft will be sunk 300 feet and for the cutting of timbers for it and the lumber for new buildings at the property, a sawmill outfit has been shipped into Lake City during the week.

At the time work was stopped on the Hough it was considered one of the richest mines in southwestern Colorado and possessed one of the largest and truest ore bodies that had been opened at that time. The values are in silver, gold and copper, the latter constituent being worth several times as much now as when shipments were made from the Frank Hough in the early days.

C. A. Mendenhall has secured a lease and contract of sale, says the Phonograph, on the noted Copper Mountain group, which includes the Accidental No. 2, Duval, Rosalia and Big Horn. These claims, under the management of Col. Dodds, established quite a reputation in 1878-9 for production of marvelously rich silver-copper ores. The local impression is general that a judicious application of capital would establish the group as a great producer of picture ore.

Hon. T. J. O'Donnell, accompanied by John A. Traylor of the Denver machinery firm of that name, arrived here Tuesday and spent a day at the Hidden Trueasure mill, completing estimates for new equipment by which the mill is to be made up-to-date in every particmular and of the highest efficiency. This is a wise move by the management and will add largely to the capacity of the property for the production of ore. It is announced that as soon as sufficient men can be obtained double shifts will be employed at both mine and mill, the scale of operations to be increased steadily.

G. H. Martin and a party of stockholders in the Hanna Mining & Milling Company arrived from Chicago lost week and were at once taken to the company's headquarters at Capitol City.

Monday morning B. F. H. Adams shipped a carload of ore from the Excelsior mine, near Capitol City, and will continue to ship as fast as the ore opened up can be broken. The property is owned by Adams & Owen, and has long been known as a pay mine. Properly equipped, it would be capable of a large production and would become one of the best mines in the county.

MINERAL COUNTY.

Very little is heard these days about the Creede camps. It is understood, howeveer, that they are booming along in good shape, outputting even more than their usual tonnage, amounting to 6,000 to 6,500 tons a month, chiefly high grade concentrates.

Lessees on the Commodore are producing nearly 100 tons a day of crude ore, and are making money.

The work of remodeling the Humphreys mill is progressing very satisfactorily and it will be completed at an early date. Conway and Ramsey are driving a crosscut tunnel in the Cassidy property, on which they, with Denver parties, hold a lease and bond.

The crosscut from the 400-foot station in the bottom of the East Willow

company's shaft cut the ore shoot last week, showing it to be the same as 100 feet above, between the second and third levels. The vein between these levels is twelve to fifteen feet wide, and almost solid galena. A depth of 400 feet in the shaft gives a depth on the vein from the apex of about 1,600 feet. The uniformity of the ore found at this great depth substantiates what all reputable experts have predicted, that the ore of the veins in Creede district continues to great depth and with gradual improvement in quality. The East Willow company will continue sinking another 100 feet to the fifth level.

The work of remodeling the Humphreys mill is being pushed with all possible dispatch, and when completed will show great improvement over the original system with much greater capacity.

In the Sunnyside district, the Krutzer-Sonata is being worked by leasers who are doing well. Several other propertiees over there are preparing to enter the shipping list.

The United Mines Company, the New York Chance, the Bachelor, Last Chance, Amethyst and others on the great Bachelor vein at Creede, are heavy and steady producers, and the Ridge, Solomon and several others up East Willow creek, are turning out their usual complement of zinc, lead and silver ores. The Creede district has became one of the richest mining sections of the state.

PARK COUNTY.

J. M. Kuhn, who is leasing on the London mine, is sinking a winze and expects to break into a great body of ore in the lower level in the next few days. This winze is in about 150 feet and there is an immense body of fine gold-bearing ore at the point it is driving for. The lessees on the famous old Moose mine report a good showing of ore. The Hock Hocking is extending its tunnel into new ground at a rapid rate.

Mr. Kuhn has one of the most valuable leases on this property in the state. The London has been a heavy shipper of high-grade gold ore for several years, and as development progresses it appears to improve both in quantity and quality. The mine has been worked for thirty-five years and is considered the most valuable property in the Mosquito range.

A crosscut tunnel is being driven on the Fanny Barrett. They are aiming for the vein with all possible dispatch, and when that is reached shipments will begin in earnest. The Fanny Barrett is one of the promising properties of Buckskin gulch and will make a good report of itself before the season is over.

Leasers are doing some good work in the old Moose mine, on Mount Bross. This noted property has a great silver record, dating back in the sixties and seventies. It has produced over $3,000,000 worth of high-grade silver ore, and in all probability these leasers know where there are hundreds of tons equally as good in the famous mine yet.

The force has been increased on the Snowstorm placer, and with an ample supply of water the miners are handling a large amount of the pay gravel. It is understood this placer enterprise is one of the best paying propositions in Park county.

Under the management of A. B. Clark, the Paris Panabase company's property is being systematically worked with good results. The mill is pounding away with twenty stamps on $10 to $15 free gold ore, and output will be increased as development progresses. Buckskin gulch is one of the richest sections of gold territory in the state. It has addded several millions to the grand aggregate, and with a little coaxing will more than duplicate its past history.

TELLER COUNTY.

(Staff Correspondence.)

R. Blanchard, a mining engineer, together with associates, has taken hold of the Good Will tunnel, and is now re-tracking, and putting in new switches. The tunnel will be used for transportation purposes and is 3,000 feet long, with a trackage of 4,000 feet. The tunnel starts at the old Florence and Cripple railroad station, and will run through to Cameron, thus tapping some very valuable properties and is virtually in the heart of the district. The porperty was formerly owned by the Good Will Tunnel and Land Company. The tunnel will cut the Cora Leland at 670 feet and will connect with the Encore and Ben Hur properties.

The War Eagle at Altman has a shaft down 250 feet, and is shipping fifteen cars of Smelter ore a month. J. O. A. Carper is the owner, and S. D. Balfour, superintendent.

The Eagle Ore Company, at Victor, are handling 15,000 tons of ore a month. Nelson Franklin is the general manager.

The camps of the Cripple Creek district are steadily increasing output and rich strikes are of frequent occurrence. The output and values for the six months of the present year ending with June, reached the total of 290,427 tons, of a gross bullion value of $7,179,811. Dividends of record declared during the same period, by seven companies, not including the Cripple Creek camp, amounted to $614,145.

Including the dividend of the United States Reduction & Refining Company, earned at its Colorado City, Florence and Pueblo plants in the treatment of Cripple Creek district ores, amounting to $591,971, and the dividends of other mining companies, the aggregate will exceed $1,250,000.

The tonnage for June as shown in the accompanying table has been exceptionally heavy, and is due in great measure to the increased tonnage treated at the Golden Cycle mill at Colorado City.

A feature of the month has been the successful treatment of low grade ores at the two leased mills of the Cripple Creek, the Homestake Company by the Ironclad and the Phoenix Milling Companies. The average value of the ores treated at these mills was $2.25 and $2.40 a ton respectively.

The figures as recorded by the mill and smelter representatives in that district are as follows:

Plant.	Tonnage.	Av. Val.	Total.
U. S. R. & R.	16,000	$24.00	$ 384,000
Golden Cycle	15,000	24.00	360,000
Portland	8,700	25.00	217,500
Isabella	3,000	6.00	18,000
Ironclad	3,100	2.25	6,975
Granville	1,000	4.00	4,000
Phoenix	800	2.40	1,920
Other small cyanide plants	500	4.00	2,000
Smelters	6,000	52.00	312,000
Total	54,100		$1,306,395

Returns of $45 a ton were received from a carload of screenings shipped by the leasers, Becker and Travell, from the Christmas mine on Bull hill. They are breaking ore from a three and a half foot vein at a depth of 1,100 feet in a winze sunk at the boundary line between the Christmas and Golden Cycle. The ore was first opened on the last named property and mined to the line.

Harris and company, operating on the Red Bird property on Gold hill, are breaking ore of a four-ounce grade from a one-foot vein. The ore body lies at a depth of 200 feet and just north of the shaft.

A 50-ton shipment has been shipped by S. N. Simmons, lessee on the north end of the Burns of Acacia company. The ore was mined between the 200-foot level and surface and is estimated to carry two to five ounces gold.

A new ore house has been constructed by Wallece & Wilson on the Kitty Wells on Carbonate hill. They have a second shipment broken. This property is the only producer on the hill.

A track has been laid in the Good Will tunnel penetrating Gold hill and lessees on the Ben Hur and other prop-

erties interscected by the bore will commence operations next week.

A depth of 150 feet has been reached in the new shaft at the south end of the Dante under lease to the British American Mining Company. Foul gases are interfering with the work, but connections with the stope from the Trail tunnel will be made early next month when the output will be increased. The production for the present month will be approximately 500 tons, ranging in value from $20 to $40 a ton.

A warranty mining deed has been recorded transferring to the Beacon Consolidated Company the Rocky Mountain and North Slope claims. The company is already developing the property which adjoins the El Paso Consolidated on the south.

The shipment of twenty tons of copper ore from the property of the Colorado Copper Mining and Smelting Company, in Red Gulch mining district, has just been treated at the United States Smelting and Refining Company at Canon City and shows returns of 31.7 per cent. copper and 5⅛ per cent. silver. This is the largest shipment that has been made from the Red Gulch district. It was practically all taken from the surface and is evidence of what may be procured by deeper mining. The ore is found between the foot-wall of lime rock and a hanging wall of conglomerate.

Crandall and company, working on the Emma No. 1 of the Isabella property, made a shipment of three-ounce ore today. The mineral was broken from a three-foot vein at a depth of 809 feet.

Charles Lund and Charles Stream have thrown up their contract on the Cripple Creek drainage tunnel and the big bore will now be built by the Drainage Tunnel Company or the mine owners of the district who have subscribed to it. The contractors found the granite so hard that they were only able to bore through eighteen feet of rock in five days, and the contract requires them to drive 300 feet a month, or an average of ten feet a day, and they decided that they could not complete the job without a loss running into many thousands of dollars.

At a meeting of the tunnel committee in Colorado Springs it was decided to go ahead with the work on company account, and operations will be resumed immediately.

The extension to the Dante vein, cut three weeks ago by the Western Investment Company in the Train tunnel on Bull hill, has widened out and last week, after a round of shots, increased to twice its former size. The ore body now measures four feet between walls and still carries the rich streak which shows values as high as twelve ounces in gold to the ton. On either side of the streak the vein gives returns of between $40 to $50 to the ton. A shipment was made the other day and returns of better than $40 were received.

Moore and associates operating on the Lottie claim of the Stratton estate on the south slope of Bull hill sent out a car which is expected to return $300 to the ton. The mineral was mined from a shallow trench in an open cut where a vein three feet wide is exposed. The shipment was sorted ore, but the mineral all the way across the vein, and without sorting, returns in the neighborhood of $50 to the ton.

It is reported that Wilson and associates, working in a fifty-foot tunnel in Boggs flats, have made a very rich strike.

It is stated that the dike is fully twenty feet wide and that neither wall has yet been found. A knife blade seam shows sylvanite running twenty-one ounces in gold to the ton. On the other side of the seam is free gold. An assay taken clear across the seam gives copper values of forty-five per cent. Boggs flats is in Fremont county and it is said the operators are trying to keep the find secret in order to locate more ground.

T. D. Drake & Co, who are working on block 102 of the Stratton estate, Gold hill, opened an entirely new vein a few days ago at a depth of 650 feet. The ore body is four feet wide and gives returns from two and one-half to three and one-half ounces of gold to the ton. Drake & Co. are working through the Chicago and Cripple Creek tunnel at a point 1,500 feet from the portal. The lessees have been making regular shipments of one-ounce ore from a good-sized ore body encountered several months ago.

The grade of ore in the Gold King property in Poverty gulch, the oldest producer in the Cripple Creek district, is reported to be improving with depth. At the 900-foot point the ore is said to be giving returns of from three to five ounces in gold to the ton. A three-foot ore body is opened at this depth. The Gold King is being operated by the Strong Gold Mining Company, which is also working the Strong mines on Battle mountain.

Darnell & Co., operating the Temonj property on Gold hill, made a shipment today of two-ounce ore. Darnell recently encountered a three-foot vein on the property and is now sending out an average of two cars per week.

A car of five-ounce ore was sent out last week from the Lucky Corner claim, adjoining the Little Clara property on Gold hill. The mineral was mined from a two-foot vein at shallow depth. The property is under lease to J. M. Parfet, superintendent of the Ophelia tunnel.

There is considerable uneasiness among the mine owners of the Cripple Creek district and Colorado Springs regarding the recent raise in shipping rates made by the Short Line directly affecting the mills. The injunction suit started a few days ago by the Taylor Brunton Sampling Company was the beginning, it is said, of a number of suits filed by mine and mill owners against the Short line. Mine owners state that while it appears on the surface that only the mills will be affected, it is understood many of the mine owners' contracts with the mills provide that any raise in shipment rates shall be borne by the mine owners and in this way some of the largest producers will be affected. The new schedule makes a raise of $1 a ton on ore running from $40 to $100, $2 a ton on all running from $100 to $150, and $3 a ton on all running from $150 to $200. A reduction has been made in ore running below $8, but it is pointed out that fully sixty-five per cent. of the ore shipped runs between $8 and $40 a ton and the reduction made on low grade ore will not counterbalance the increase made in the shipment rates for high grade.

The following are the new freight rates a ton:

$8 ore or less	$ .75
$8 to $20 ore	1.00
$20 ore to $25 ore	1.25
$25 ore to $30 ore	1.25
$30 ore to $40 ore	2.00
$40 ore to $100 ore	3.50
$100 ore to $150 ore	4.50
$150 ore to $200 ore	5.50
$200 ore to $300 ore	6.50
$300 ore up	6.50

Notice has also been served on the samplers in Cripple Creek of an increase of freight rate charges amounting to 20 cents to the ton. Waters explained that this sum was simply for switching charges. He says that since the company has been doing switching for nothing the loss to the company has been heavy, because many of the producers sent the bulk of the product to the samplers. The switching charge means that competition will be keen between the samplers and the smelters, which will naturally be to the advantage of the railroads.

If this policy is continued it might result in opening up large bodies of low grade ore, thus greatly increasing the tonnage output of the camps, which will not only benefit the railroads but the mills as well.

An enormous deposit of pure salt is reported to have been found on the west side of the Utah desert, not far from the Nevada State line.

GREAT MINERAL VEIN IN NORTH PARK.

A vein of gold, silver and copper ore a mile and a half long and one hundred and fifty feet wide has been discovered in Cameron mountain, North Park, according to I. R. Blivin of North Park, to Secretary J. J. Burns of the State Commercial association. Blivin was recently in Denver, and says Cameron mountain and the hills in its vicinity are highly mineralized and that North Park will be the greatest mining camp in the state, if it is opened up by the proposed Colorado, Wyoming & Idaho railway, now known as the Denver, Yellowstone & Pacific, which is projected through that section of the state.

"Blivin located some of the first coal claims in Routt county," said Mr. Burns, "and pending the construction of the Moffat road went into North Park to prospect.

"He tells me that he discovered copper stains in abundance, and, after considerable prospecting, located and patented ten mining claims on Cameron mountain, which is in Larimer county, between North Park and the Poudre valley.

"He sold one of his claims to Peter Anderson of Fort Collins, who is connected with the Poudre Valley bank. Mr. Anderson is a shrewd business man and would not go into a thing unless he knew it was all right.

"Mr. Blivin tells me that the ore is all of pay quality and that Cameron mountain is filled with porphyry. He had the ores assayed and says the result was satisfactory."

According to the story of the prospector, the only drawback is lack of transportation facilities. There are no railways in North Park, and mining products would have to be hauled so far that it would not pay to develop the mines at present. Mr. Blivin says that surveyors and engineers of the Denver, Yellowstone & Pacific have been working in the vicinity of Cameron mountain for six months, and that the proposed line now runs over Cameron pass, the lowest point in the mountains.

"If the road is built over Cameron pass it will go close to the mountain of that name, and will be almost within a stone's throw of the claims patented by Mr. Blivin.

Former Gov. Fennimore Chatterton of Wyoming is in charge of the Denver, Yellowstone & Pacific railway. Eastern capitalists are said to be backing this line, but it was originally projected by Kansans, who did not have much financial standing. The proposed road is to be extended from Denver to Portland, Ore., by way of North Park, Laramie, Wyo., and Boise, Ida.

A dispatch to Mines and Mining from Steamboat Springs says gold and silver bearing quartz has been uncovered in the Veta Grande tunnel, assays from which show values of $113 a ton, chiefly gold.

The property is owned by the Veta Grande Mining & Milling Company and is on Copper Ridge, four miles from here. The company consists of C. E. Vivens, C. H. Rowlette, A. M. Gooding and G. I. Bratton of Steamboat Springs, and R. B. Brown of Denver. The tunnel is in 177 feet and strikes the lead at a depth of 120 feet. This lead is said to be 20 feet wide. Two shifts are at work.

The placer fields of the Hahn's Peak district are attracting considerable attention from California parties, representatives of several Los Angeles companies having gone to the field during the week. The success of the dredge which has been at work the last two months has exceeded the anticipations of the company operating it and it is estimated that the clean-up will exceed $700,000.

THE BLACK HILLS

The starting up of the mines of the county will be a boon to the Consolidated Power and Light Company whose magnificently equipped plant has only had employment for a small portion of its capacity during the shut down. The Spearfish, or Redwater company will also share in the benefits arising from the resumption of operations by the old companies and opening up of new ones. The mining industry of the Black Hills, or more particularly of Lawrence county, already owe much to the cheaper electric power developed and transmitted over pole line and still greater benefits are to come in the future.

The Portland and Clinton companies will not be hampered by the necessity of any preliminary work, and can begin taking out ore immediately.

Speaking of the great fire and the flood required to put it out the Pioneer Times says it was the greatest fire that ever took place in a mine.

It is impossible at this date to estimate the actual loss to the company. The greatest item, of course, comes in the loss of the product which can be reckoned very fairly. From April 3rd to Aprill 22nd only 600 out of 1,000 stamps were dropping and from April 22nd to May 30th there was no output whatever. The average monthly bullion output of this company is about $400,000, and hence the bullion loss for this time approximates $493,160. There must be taken into consideration also, the fact that when the mills began work on May 29th, only 440 stamps were dropping out of the 1,000. This means that the monthly product will be diminished by over one-half while this continues, and how long that will be, it is impossible to say. The loss in bullion may, however, be placed very conservatively at $1,000,000. The cost of flooding the mine was but little more than nominal, while the cost of unwatering will include the cost of labor and fuel for operating the skips.

On April 22nd, the order to flood went forth, the last resort, and everything, even the few mills which were still operating, were closed. The workings of the mine are 1,550 feet deep, and there are over a hundred miles of underground channels. The natural inflow of water into the mine filled it to the 1,100-foot level, and from there up, the work of filling was accomplished in an unexpectedly short time. The space to be filled amounted to 68,393,621 cubic feet, and required 507,000,000 gallons of water. In order to effect this flooding, water was turned in through the Ellison hoist, the open cut, and even the old Lincoln shaft was opened up for this purpose. By means of a flume, water was brought in through a tunnel at the north end, and a great part of Whitewood creek was turned in through the Savage tunnel by a flume 3,200 feet long, twenty inches wide and thirty inches deep. This gave a volume of water equal to about 7,500 gallons a minute, and this in adition to the water the mine makes and the additional supply caused by the heavy rains and snows, brought the flood to the highest possible point, about eighty feet on the 300 level, by the 29th of May, only thirty-seven days from the commencement. When this was accomplished there was no question but that the fire was out.

That the fire is out is a great source of satisfaction to the entire country. Several hundred men have already gone to work and this force will be increased steadily. It is not too much to hope that the mine will be unwatered and running at its full capacity by the first of August, at the fartherest, and the loss to the company, inclusive of the bullion loss, will probably not exceed one and a quarter million dollars.

When the mines and mills were closed down on the first of the year on account of a disagreement between the operators and miners as to the number of hours that should constitute a day's work, a large number of the men thrown out of employment, left the county for other camps.

When the Homestake fire broke out in April more men went. It is estimated that between five and six hundred miners have left the county during the last six months.

The Homestake fire has been overcome and the company will need as many men as it had in its employ before the fire. All the other companies in the county have amicably adjusted the differences with the miners and will employ as many men as they had before the shut-down, and some of them will need more men, especially the Mogul which had only been employing a small force taking out shipping ore, as the company's mill had burned two years previous and the new mill had just been completed at the time of the strike. The company's new mill at Pluma would be running full capacity, if a sufficient number of miners and mill men could be had. Other companies contemplate employing as large forces as they had, and some will increase. The Branch Mint Company is expected to start up at an early date and will require at least one hundred more men than are at present on the pay roll. A number of new companies, or old companies that have not been working for several years, are arranging to do more or less work the present year.

The inducements offered to good miners and mill men are as attractive as is possible for conditions to be in the mining industry. Eight hours will constitute a day's work. Mining operations are most all near the surface, the mines are dryer and more healthful than in other camps; the mills are practically all wet crushing; living expenses are lower, the climate cannot be improved upon, and no prettier country can be found anywhere.

JOPLIN

(Correspondence.)

Henceforth the Joplin district must be considered one of the world's greatest mining camps, as the increase during the first five months of the present year now make it certain that the output for 1907 will easily pass the $18,000,000 mark, and if the present rate of increase is maintained the year's total will exceed $19,000,000. During the five months just ended the zinc ore mined in this district amounted to 254,245,520 pounds, which sold for $5,991,197. During the corresponding period in 1906 the output was 219,913,660 pounds, which sold for $4,760,879, an increase of 34,331,860 pounds in production and $1,230,318 in value.

During the past five months there has also been mined 39,909,380 pounds of lead, which sold for $1,634,373, as against a production of 30,352,010 pounds, which sold for $1,144,036, during the corresponding period in 1906, making an increase of 9,557,370 pounds in production and $490,337 in value.

The total value of both ores for the first five months of 1907 amounts to $7,635,570. The total value for the corresponding period in 1906 was $5,904,015, and in 1905, $5,193,200; making an increase of $1,731,555 over last year, and $2,442,370 over the same period in 1905. This is an average gain of $346,311 per month since January 1, which if maintained will make the year's increase $4,155,732 over 1906, when the value of the ore produced amounted to $15,111,834.

The heavy storms in the early part of May flooded the Badger-Peacock mines, and resulted in cutting off some 400 tons per week from the district's production, but five new mines have started during the month, with an aggregate weekly production of about 360 tons, which will maintain the district's total until the flooded mines are unwatered.

The month of May closed with the top price of zinc ore around $51 per ton, and lead bringing about $83. At the same time last year the top price for zinc ore was $44 per ton, and $81 per ton for lead.

Some splendid new properties are being developed, and outside investors are beginning to find out that it is safer and more profitable to put their money into the development of proven prospects than to purchase producing mines at high prices.

WYOMING

From Lander come reports that Superintendent Wells of the Miners' Delight says the mine has been drained to the 190-foot level. He believes he work of unwatering the property will be completed early the present month. Fifteen men are at work there, repairing the buildings and putting the mine in shape for continuous operation.

The steel and iron for the new smelter at Encampment has been ordered and will be installed within sixty days. The smelter will be compartively fireproof, and it is hoped it will have a long life of usefulness.

The Laramie, Hahn's Peak & Pacific railroad is about completed to Saratoga, forty miles from the main line of the Union Pacific, and will be pushed on to Encampment, Pearl and other points as rapidly as possible. The road was started six or seven years ago by Isaac Van Horn of Boston, but it did not make much headway until Encampment sprung into prominence. Fred A. Miller of Laramie is president of the present company.

H. O. Granberg of Oskosh, Wis., manager of the Steam Springs Coal & Coke Company,, was in Encampment a few days ago, to attend to the erection for the company of a MacDonald hot blast smelting plant of sixty tons capacity, adapted to the treatment of low-grade copper ore. It will be located near the property of the company, near Copperton. Besides several copper claims, the company owns about twenty coal claims and contemplates the manufacture of coke. The machinery has been ordered and a practical smelting man is due to arrive in a few days to construct the plant.

Ash Brile of New York, brother of Alfred Brile, manager of the Itmay, is in camp to see his brother and investigate some mining propositions. Mr. Brile is a mining broker and has an extended acquaintance with New York investors, including former Senator W. A. Clark, and if satisfied with his examination, will get capitalists interested in some of the properties of the district. Mr. Brile has had considerable experience as a practical miner, having prospected in Alaska in his younger days, and is in a position to judge the merits of a mining claim.

Government engineers, under the direction of Joseph Gaff, have been ordered to Sheridan county to determine the extent and character of the coal areas there, in order that the land office will be in possession of information which may prevent future coal land frauds. The examination will begin about the middle of July. The settlers are very much in favor of the movement.

STRUCK GAS IN MONTROSE.

In boring for oil in Montrose county it seems they struck gas. President H. C. Fink of the Montrose & San Jose Oil Company says the workmen were excited when a great pressure of the artesian water started in. They measured this pressure, which has been increasing right along, and say it amounts to 551 pounds to the square inch. The water coming to the surface has a strong gas smell and President Fink says there are some vapors rising from the bore. He says the pressure is too great to be caused by water alone and thinks that as soon as they go a little deeper there is no question but that a big body of lighting and heating gas will be encountered.

THE STOCK AND METAL MARKETS

Colorado Springs

July 3. — On Monday trading opened up light, mostly in the mines list. Acacia sold at 9½, Dr. Jack Pot was indemand and sold at 7⅛ to 7½ El Paso sold at 40½, Mary McKinney at 58, Portland at $1.25. On Tuesday trading continued light, with sales entirely in the mines list. Acacia selling at 9½, Sante at 4¾, Elkton at 54⅝, Findley at 53, Mary McKinney at 57 and 57½, Pharmacist at 4¾. Wednesday Portland jumped to $1.30, 10 cents higher than last sale, and closed at $1.28½ bid. The advance was due from good reports from the mine. The rest of the stocks were dull.

Brokers say that the reason for so little trading on the exchange is that buyers are placing their money in other stocks that are not half as secure as Colorado Springs. The stocks on the exchange are sound investments, and pay accordingly. One broker the other day attributed the dullness to investors placing their money in other stocks on other markets, where the backing is not half as safe as Colorado, but where the chances to make big fortunes seem better. The mines in the Cripple Creek district produced over $12,000,000 last year, which shows that shares in this district are worth something more than the paper they are printed on.

Following are the quotations:

Mines.

	Bid.
Acacia	08
C. C. Con.	04½
C. K. & N.	07
Dante	04⅞
Doctor-Jack Pot	07
Elkton	54½
El Paso	41½
Isabella	20
Findley	52
Gold Dollar	07
Gold Sovereign	03⅞
Index	02½
Isabella	20
Jack Pot	04
Last Dollar	02
Lexington	02½
Mary Cashen	03
Mary McKinney	56⅝
Moon Anchor	02
Old Gold	03
Pharmacist	04½
Portland	128½
Vindicator	78
Work	12¼

Unlisted.

Jennie Sample	05½
Jerry Johnson	05
U. Gold Mines	07¼

Prospects.

American	009
Anchor	0065
Aola	008
Banner	01
Buckhorn	0065
Des Moines	01
Gould	02¼
Grace	002
Ida May	02½
Jolly Jane	01¼
Litle Bess	01
Little Nell	01
Little Puck	01¼
Mary Nevin	01¼
Missouri	006
Mt. Beauty	07½
National	007
New Haven	01
Olive Branch	005
Pointer	005
Rattler	004
Raven	01
Republic	009
Rose Maud	01½
St. Thomas	01½

Miscellaneous.

Blanche	003
Cable	005
Colo. Gold Camp	005
Easter Bell	0025
Flower of the W.	007
Gold Hill	002
Hummer	005
Kitty	002
Matoa	003
Marquette	002
M. J. T.	002
Montreal	005
Nellie V.	003
Uncle Sam	003
Volcano	001
Wide Awake	002

Separate Sales.

MINES—El Paso, 1,000 at 42; Pharmacist, 2,000 at 4¾; Portland, 1,000 at 130, 400 at 130; Mary McKinney, 500 at 58.

UNLISTED.—Gold Coin, 5,000 at 005.

Denver

July 3.—The following are the sales and quotations on the Denver mining and stock exchange today:

Stock	Bid.	Ask.
Acacia	09¼	09⅝
C. C. Con.	04⅜	05
Dante	04¾	05
Work	15⅜	16

New York

July 3rd.—The Consolidated Copper Company has been formed under the laws of Delaware with a capital of $50,000,000, divided into 10,000,000 shares, par value $5. The company will absorb he Ely Mines Company. Other companies will be taken in later on. The incorporators include James Phillips, Jr., William B. Thompson of Hayden, Stone & Co., W. Hinkle Smith of the Nevada Consolidated Company and the Guggenheims. It is said that the company will eventually be a holding company to take over the Nevada Consolidated, Cumberland-Ely, Utah Copper Company, Ely Mines Company and other properties. The stock of the four companies is 3,350,000 shares, which are now valued on the market at $48,000,000, and last year had a valuation of $80,000,000. New smelters, concentrating plants and other improvements will be made in the equipment of the company.

A decline in the price of copper is expected during July, this having been admitted by representatives from the largest copper interests. The representative of one of the largest international concerns, handling millions of pounds of copper annually, says: "It is quite likely that the completion of the July inventories by the manufacturers will result in a decided change for the better in copper so far as activity and sales are concerned. The situation itself is healthy enough.

"So much newspaper talk of business depression in various lines reflects on the small buyer, which in turn makes less business for he wholesaler and finally falls back upon the manufacturer, who will not commit himself for anything which he does not actually need.

"But to what extent has this business depression come upon us? I have heard nothing from our correspondents which would indicate a falling off in business; neither have I received any report that any of the manufacturers are running on materially less time or with fewer hands than heretofore."

The United Metals Selling Company, which has been quoting a nominal asking price of 25¼ cents a pound for some time, is expected to take action this week and announce its new price for deliveries from July 1. Estimates as to what this will be range from 22 to 23 cents a pound.

It is interesting to note that in London standard copper for delivery three

months hence is selling at a figure equivalent to between 19½ and 20 cents. The visible supply of standards over there is down to a minimum, about 2,500 tons, and it is considered probable that warrants representing standard copper, which is a very inferior grade of casting, have been sold recently far in excess of supplies.

The directors of the United States Smelting, Refining & Mining Company have declared the regular quarterly dividend of 87½ cents on the preferred and common stocks. Robert T. Paine was elected a director to succeed Eugene N. Foss.

H. H. Rogers, who is in Europe, was not present at the meeting of the Anaconda Copper Company at which the regular quarterly dividend was secured. Anaconda now pays 12 per cent, and the earnings for the first six months will be about $2,500,000.

Newhouse Mines & Smelters stock will be placed on dividend basis this month.

The latest purchase by the United States Treasury Department of 100,000 ounces of silver at 67.803 cents an ounce represents a recovery of 2½ cents an ounce from the low point of the year resultant from a slump from last year's high price.

Last year the price of silver was advanced from 64.597 cents, the average price for the month of March, to 70.813 cents in November; the subsequent reaction caused the metal to drop to 65.462 cents in April of the current year, while later transactions have been at a constantly advancing figure, the last recorded being at 67.503 cents.

	Close.
Amalgamated Copper	87½
Am. Smelter	119⅝
do pfd.	107¾
Anaconda Copper	60
Rep. Steel	29½
do pfd.	84½
Nat. Lead	62
U. S. Steel	37½
do pfd.	100⅛

Mining Stock Exchange:

	Close.
Adams Con.	10
Alice	40
Breece	20
*Brunswick Con.	50
Comstock Tunnel	26
C. C. & Va.	61
Horn Silver	1.45
Iron Silver	2.10
Leadville Con.	09
Little Chief	07
Ontario	4.00
Ophir	1.65
Potosi	09
Savage	63
Sierra Nevada	33
Small Hopes	35
Standard	2.00

*Offered.

Curb Stocks.*

	Close.
Arizona Commercial	27
American Saginaw	90
Black Mountain	5¼
Butte Exploration	20
Cumberland Ely	9
Davis-Daly	13
Denn. Mining	8½
Ely Con. Copper	1⅛
East Butte	11½
Furnace Creek	70
Foster	75
Giroux	8
Greene Cananea Cop	17
Greene Gold-Silver	1½
Globe Con. Copper	14
King Edward	1⅛
Keweenaw	8¾
Mitchell	3
Nevada-Utah	6
Nevada Con.	14½
Nipissing	11⅝
Superior & Pittsburg	17⅛
Silver Leaf	10
Superior Copper	12
Tintic	5⅝
Utah Apex	6½
Warren	8
Wolverine Arizona	2¼
Dom. Copper	6
Ely Giroux	1¼
B. & L.	1¾
Carisa	50
Mont. Sho	7⅜

*Otis & Hough.

Boston

July 3.—The Shannon Copper Company now has 3,100 stockholders. This is an increase of 100 per cent. since the first of the year. This would indicate that brokers are carrying little stock.

The Kearsage lode has been uncovered on the Cliff property of the Tamarack. Tamarack output is now over 14,000,000 pounds per annum. Tamarack has 60,000 shares and on December 31st last, showed net quic asset of $962,219.

The Utah-Apex Mining Company is now on an earning basis of $75,000 per month. Over $500,000 in cash has been expended on this property in development and equipment.

Regarding copper interest having affiliations with the United Metals Selling Company says: "The producers, and I mean, of course, only the large ones, could not sell a pound of immedate delivery copper should they receive orders for it, and in fact could not make deliveries before July 15th in view of the shapes and sizes consumers are now demanding.

"The producers have not a pound of surplus copper and the manufacturers are threatened with a shutdown of their plants if they do not immediately take on new supplies, and, strange as it may seem, the producing interests are in great perplexity as to the size of the concession to be made.

"If I owned the entire capital stock of the copper mines in which I am interested, I would stay out of the market for six months and allow my copper to accumulate. In other departments of trade, producers are always carrying a surplus stock, but in copper all ordinary methods of business seem to be set aside. Just why producers should be considering a price reduction in these time of depleted stocks and an active consuming demand all over the world, a demand which surpasses the productive capacity of the mine, is beyond my comprehension.

"Charles F. Brooker, who buys between 200,000,000 and 250,000,000 pounds of copper per annum, or 35 per cent. of the entire American consumption, has not yet covered his requirements, and the trade naturally awaits his action.

"It is very probable that at this time the United Metals Selling Company, which is only an agent of the mining companies, will be guided in large measure by the wishes of the compan-

(Continued on Page 32.)

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MACHINERY AND EQUIPMENT

Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.

MINE VENTILATION BY EXHAUSTING.

(Contributed.)

It is customary to ventilate tunnels or drifts by means of blowers, the air behind conducted to the end of the tunnel by means of a pipe of galvanized iron. Modern practice has proven beyond a doubt that exhausting is much more advantageous than blowing. After a shot is fired and the end of the tunnel is filled with smoke and foul gases, if fresh air is blown through the air pipe, it simply serves to dilute the smoke and gases. After a considerable length of time, the smoke and gases are well enough diluted for the re-entrance of the workmen, but many hours are required before the last trace of the fumes is gone. Many a headache is prevented by exhausting the air through the ventilating pipe instead of blowing. The ventilating pipe should be run as near to the end of the tunnel as is possible and the exhauster started immediately after shooting. The smoke and foul gases enter the end of the pipe without much disturbance. It is readily seen that fresh air will come into the tunnel as fast as the foul air is exhausted and that instead of merely diluting the foul gases, the gases themselves are rapidly exhausted. Much time is saved in this way.

It is sometimes arranged to first exhaust and then to blow in fresh air, but it is doubtful if this has any advantage over exhausting continuously. Modern exhaust fans are built in two types; the first being the fan type, and the second the cycloidal or positive type. With the latter a pressure of three or four and even as high as five pounds per square inch can be created and a vacuum of two or three pounds. This type is preferred for a very long ventilating pipe, but its cost is considerably greater than that of a fan exhauster of similar capacity.

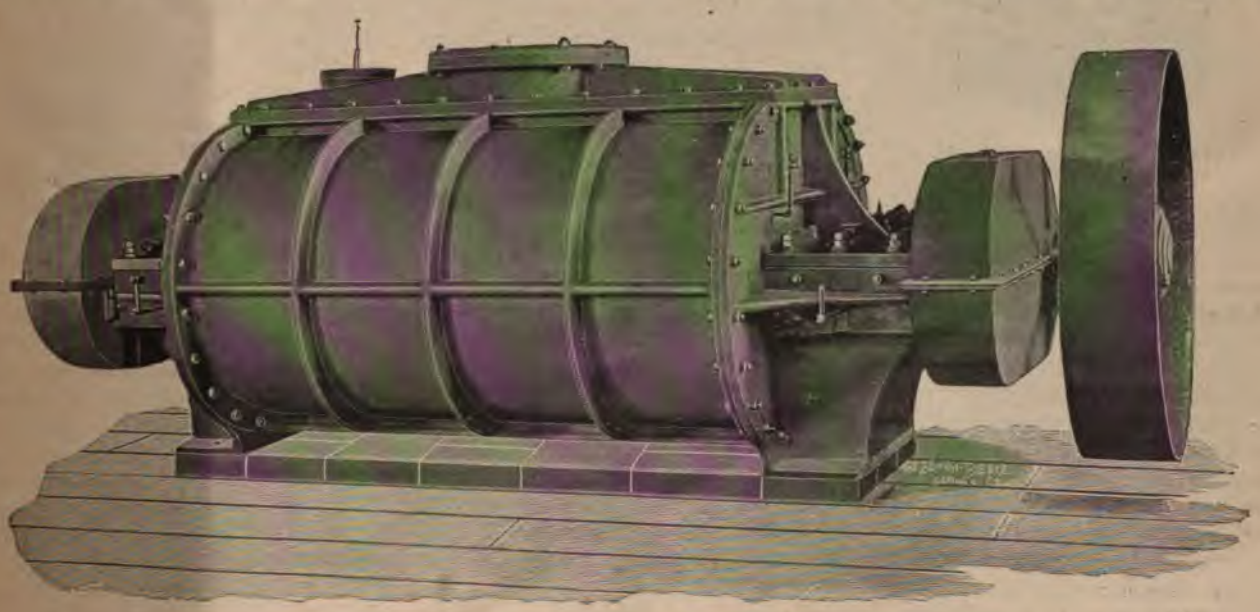
The fan type has a tremendous capacity, but is incapable of creating more than a few ounces pressure or vacuum. The fan type is carried in stock in all sizes by Hendrie & Bolthoff Manufacturing & Supply Company of Denver, but the Cycloidal type is obtained on special order only.

SUCCESSFUL PORTABLE PROSPECTING ENGINE.

In the accompanying cut we show a Lidgerwood portable prospector's hoist for prospecting and developing small mines and for sinking shafts to depths of less than 500 feet. These hoists are thoroughly self contained, are convenient for transportation, require no special foundation and are economical in the consumption of fuel. They are similar in all respects to our regular Lidgerwood hoists except that they are specially adapted for hoisting at a high speed. They are supplied with a powerful band brake, lined with hard wood, and applied by means of a foot lever, with a simple device of adjusting and taking up the wear.

Blower.

They are well constructed in every way, are especially designed for hard usage, and are almost impossible to get out of order. Every engine is thoroughly tested at our works before being sent out. Single cylinder engines are built in five sizes from six to twenty-five horse power and will



Ventilating Fan.

hoist loads of from 1,000 to 4,000 pounds at a speed of from 200 to 275 feet per minute. The double cylinder engines are built in five sizes from twelve to fifty horse power and will hoist loads of 2,000 to 8,000 pounds at above speed. These hoisting engines are thoroughly guaranteed to give the best of satisfaction and we believe their compactness and strength will appeal to the mine operators at the smaller properties and will fill a long felt want for an engine of this character. These engines are carried in stock by the Morse Bros. Machinery & Supply Company, Denver, Colo.

IMPROVED STEAM HAMMER.

The American Forge Works of Denver has installed a new standard steam hammer. The total weight of the hammer is 20,000 pounds. It takes steam both ways and has an extreme stroke of twenty-eight inches, with steel die keyed in; the piston and ram is in one forging. The hammer presents great advantages in its simplicity of construction and the perfection of its proportions. There are three clear sides at which to work, and the

Standard Steam Hammer.

center of the die being twenty-two inches from the column, there is sufficient room for a piece of work of any shape to be readily handled. This hammer is capable of doing work from twelve-inch diameter down. It is especially adapted for locomotive or general forging. The total weight of the hammer is 20,000 pounds and was made by the McDougal & Potter Company of New York City. The American Forge Works, at which the hammer has just been installed, is growing rapidly in business, as this is the second hammer now in that shop, making them prepared to handle work of the largest kind.

SECURING GOOD MEN.

The work of securing men of ability to fill positions connected with mining or milling has of late become a business in itself. The average employer has not sufficient time to in-

Prospector's Hoisting Engine.

vestigate each man that applies to him for a position, and often men who are supposedly efficient in their line often prove utter failures, after much time and money has been spent in securing them. Often good men remain out of positions simply because they are unable to make the fact known to those that need their services. To secure positions for technical men and to secure competent help for employers is the business of the Interstate Business Exchange, with offices in the Kittredge building, Denver, Colo.

OBITUARY

William Cox was killed in the Gorman coal mine near Marshall last Saturday. After firing a blast be was caught by falling rock and crushed to death. He was thirty-five years of age and had only been employed at the mine a short time.

John Murrah of Cripple Creek, aged thirty-six years, one of the lessees of the Chicken Hawk mine, dropped dead in the ore house of heart disease Sunday. An autopsy disclosed a rupture of the heart, the hemorrhage causing death. He is survived by the widow.

Ernest Steel, engineer on the Short Line between Colorado Springs and Cripple Creek, was crushed to death by the overturning of his engine and several cars a few miles east of Cameron, June 27th. His home was in Colorado City, where his wife and children reside.

Louis M. Buford, a prominent mining enginter of Mexico and father of Charles Buford, a director of the Mexican Central railroad, died in a parlor car on the Bay State Limited express for Boston the 29th of June. He had just recently landed from the steamer Galveston and was on his way to Boston.

Emil B. Arndt, formerly of Denver, died of injuries received in the fire that destroyed the house he lived in on the plantation of the Denver and Honduras Fruit Company, San Pedro, Spanish Honduras. He left Denver three years ago to take charge of the plantation as manager. Deceased leaves a wife, Mrs. Myrtle and a son five years old, who reside with Mrs. Arndt's mother, Mrs. J. A. Stonehocker at Broomfield, this state.

Louis Hartson, formerly from Colorado Springs, was killed near Glen Eyrie, Wyoming, last week by falling from a load of wood he was hauling. the wagon passed over his head crushing it. The body was taken to Laramie and in charge of the widow forwarded to his former home in Massachusetts for burial.

Mayor Watson Middaugh of Montezuma, Summit county, died suddenly last week while at work in a mine. Heart trouble was supposed to have been the cause of his death. Deceased was a single man, born in Huntington, Indiana and was but forty-two years of age. He had lived in Montezuma for fifteen years, was a Mason in good standing and was highly respected by all who knew him.

Cresta Papadakis, a miner working on the Sherman lease in Marshall basin, San Mignel county, drilled into a missed shot the other day which blew his head off. These terrible warnings don't seem to lessen mine accidents of that character in the least. Miners go right on drilling out missed shots and getting killed.

Thomas B. Campbell, an old time and highly respected citizen of eGorgetown, this state, died at his home in that town June 22nd, at the age of seventy-seven years. He was born in Washington county, Pennsylvania, and settled in Georgetown in 1877. Deceased had been active in municipal affairs, having served one term as mayor of Georgetown, twelve years as city clerk, and at the time of his death was serving his third term as a member of the board of selectmen. Wife, seven sons, two daughters and three brothers survive him.

William H. Gribbles, a pioneer and one of the early settlers of Fremont county, died at Conon City last week of brights disease, aged sixty-three years. He was born in Clinton county, Misosuri, came to Denver in 1860 and settled in Fremont county in 1870. A widow and three children survive him.

Capitalization and Dividends of North American Mines and Works

Gold, Silver, Copper, Lead, Nickel, Quicksilver and Zinc Companies.

NAME AND LOCATION OF COMPANY.	Author-ized Capital Stock.	Shares Issued.	Shares Par Val.	Dividends Paid in 1907	Dividends Total to Date.	Dividends Latest Date.	Dividends Latest Amt.
Acacia, g., Colo	$ 1,500,000	1,433,000	$ 1	.....	$ 73,780	Dec. 1904	$0.01
Adams, s, l, c, Colo	1,500,000	150,000	10	.....	746,000	Jan. 1905	.05
Aetna, Con., q, Cal	500,000	100,000	5	.....	325,000	April. 1900	.15
Alaska Goldfields, Alaska	1,500,000	250,000	5	.....	260,000	Jan. 1901	.15
Alaska Mexican, g, Alaska	1,000,000	180,000	5	90,000	1,595,381	Jan. 28 . 1907	.50
Alaska Treadwell, g, Alaska	5,000,000	200,000	25	200,000	8,585,000	Jan. 28 . 1907	1.00
Alaska United, g, Alaska	1,000,000	180,200	5	54,060	280,200	Jan. 28. . 1907	.30
Alice, Mont.	1,000,000	400,000	25	.....	1,115,000	Jan. 1899	.05
Amalgamated, c, Mont.	155,000,000	1,530,879	100	6,123,518	49,540,746	May 27. . 1907	2.00
Am. Sm. & Ref., com, U. S.	50,000,000	500,000	100	1,750,000	10,500,000	April 15 . 1907	1.75
Am. Sm. & Ref., pf, U. S.	50,000,000	500,000	100	1,750,000	24,331,553	April 1. . 1907	1.75
Am. Sm. Securities, A pf, U. S.	17,000,000	170,000	100	510,000	2,295,000	June 1 . 1907	1.50
Am. Sm. Securities, B pf, U. S.	30,000,000	300,000	100	750,000	3,000,000	June 1 . 1907	1.25
Am. Zinc, L. & Sm., Mo.	3,750,000	150,000	25	.....	180,000	Jan. 1904	1.00
Anaconda, c, Mont.	30,000,000	1,200,000	25	4,200,000	35,100,000	Apr. 18. . 1907	1.75
Annie Laurie, g, Utah	5,000,000	25,000	100	.....	439,561	Apr. 1905	.50
Atlantic, c, Mich.	2,500,000	100,000	25	.....	990,000	Feb. 1905	.50
Bald Butte, g, s, Mont	250,000	200,000	1	.....	1,337,148	Jan. 1904	.12½
Baltic, c, Mich.	2,500,000	100,000	25	.....	2,650,000	Dec. 17. . 1906	8.00
Beck Tunnel Con., Utah	1,000,000	1,000,000	1	200,000	800,000	May 20 . 1907	.04
Boston, q, Cal.	1,000,000	100,000	10	.....	20,000	Apr. 1903	.06
Boston & Colo. Sm., Colo	750,000	15,000	10	.....	402,350	Oct. 1902	.75
Boston Gold Copper, Sm., Colo	1,000,000	1,000,000	1	.....	150,000	Nov. 1901	.02½
Boston & Mont. Con., c, s, g, Mont	3,750,000	150,000	25	3,600,000	54,325,000	May. 1907	12.00
Breece, l, s, Colo	5,000,000	200,000	25	.....	200,000	June. 1903	.05
Brunswick Con., g, Cal.	500,000	135,770	1	.....	13,577	Dec. 20. . 1906	.03
Buffalo Hump, g, Idaho	1,000,000	100,000	10	.....	300,000	Jan. 1901	.10
Bullion-Beck & Champion, Utah	1,000,000	100,000	10	20,000	2,770,000	Apr. 15. . 1907	.10
Bunker Hill & Sullivan, Idaho	3,000,000	300,000	10	900,000	8,766,000	May 4 . . 1907	.60
Butte & Boston, c, Mont	2,500,000	200,000	25	.....	1,800,000	Feb. 1904	1.00
Butte Coalition, c, Mont	15,000,000	1,000,000	15	1,000,000	1,800,000	June 26 . 1907	.50
Butterfly Terrible, g, Colo	1,500,000	1,250,000	1	.....	31,250	Oct. 1901	.00½
Calumet & Arizona, c, Ariz	2,500,000	200,000	10	2,000,000	8,000,000	June 1 . 1907	5.00
Calumet & Hecla, c, Mich	2,500,000	100,000	25	2,000,000	101,350,000	Mar. 22. . 1907	20.00
Camp Bird, g, Colo.	5,000,000	820,000	5	393,600	3,427,704	Apr. 27. . 1907	.24
Carisa, g, s, c, Utah	500,000	500,000	1	.....	140,000	Dec. 1906	.01
Cashier, g, Colo	1,000,000	900,000	1	.....	26,160	Apr. 1904	.00½
Centennial Eureka, g, s, l, c, Utah	5,000,000	100,000	25	.....	2,917,700	Feb. 1905	1.00
Center Creek, l, z, Mo	1,000,000	10,000	10	.....	200,000	June. 1905	.10
Central Eureka, g, Cal.	4,000,000	400,000	10	.....	799,159	Mar. 1906	.05
Century, g, s, l, Utah	150,000	150,000	1	3,000	33,000	Feb. 15. . 1907	.02
Champion, c, Mich.	2,500,000	100,000	25	200,000	1,800,000	June 1907	1.00
C. K. & N., g, Colo	1,500,000	1,431,900	1	.....	229,104	Dec. 1904	.01
Clinton, g, s, Colo	100,000	1,000	100	.....	60,000	Dec. 1903	.30
Columbus Con., g, s, Utah	1,500,000	283,333	5	99,167	99,167	Apr. 5. . 1907	.20
Colwyn, Idaho	500,000	400,000	1	.....	4,000	Aug. 1906	.01
Combination, g, Nev.	400,000	360,000	1	.....	873,000	Dec. 1906	.15
Con. Cal. & Va. s, g, Nev	540,000	216,000	2½	.....	3,963,600	July. 1901	.10
Con. Mercur, g, Utah	5,000,000	1,000,000	5	.....	1,180,000	Dec. 19. . 1906	.02½
Consolidated, g, Colo.	2,500,000	1,900,000	1	.....	380,000	Mar. 1902	.01
Continental, z, Mo.	550,000	22,000	25	22,000	209,000	Apr. 1. . 1907	.50
Copper Range Con., Mich.	38,500,000	383,781	100	767,562	4,989,153	Apr. 1. . . 1907	2.00
Creede & Cripple Creek, g, Colo.	800,000	800,000	1	.....	16,000	May. 1901	.02
Creede United, g, Colo	500,000	500,000	1	.....	187,500	July. 1906	.00½
Cripple Creek, g, pf, Colo	125,000	125,000	1	.....	45,000	Jan. 1902	.04
Cripple Creek Con., g, Colo	2,000,000	2,000,000	1	.....	180,000	Mar. 1905	.00½
Croesus, g, Calif.	1,000,000	200,000	5	.....	227,300	Aug. 1901	.05
Crowned King, g, s, Ariz.	6,000,000	600,000	10	.....	242,760	May. 1901	.02
Dalton & Lark, g, s, l, Utah	2,500,000	2,500,000	1	.....	350,000	July. 1901	.10½
Daly-Judge, Utah	300,000	300,000	1	225,000	225,000	Apr. 12. . 1907	.37½
Daly, g, s, l, Utah	3,000,000	150,000	20	.....	2,925,000	Mar. 1897	.25
Daly-West, g, s, l, Utah	3,600,000	180,000	20	108,000	5,507,000	Mar. 15. . 1907	.60
De Lamar, g, s, Idaho	400,000	67,180	5	.....	2,926,370	May. 1905	.72
Deadwood-Standard, pf, So. Dak.	600,000	600,000	1	.....	6,000	Dec. 1903	.01
Dewey Con., g, Utah.	310,000	10,000	1	.....	5,850	June. 1901	.10
Diamondfield, g, Nev.	1,000,000	732,000	1	.....	14,650	Sept. 1905	.02
Dollon, g, Colo.	1,250,000	1,250,000	1	.....	156,250	Nov. 1905	.01
Doctor-Jack Pot Con., g, Colo	3,000,000	3,000,000	1	.....	267,000	July. 1906	.00½
Doe Run, l, Mo.	10,000,000	59,062	100	59,062	1,106,134	Apr. 15. . 1907	.50
Elkton Con., g, Colo.	3,000,000	2,500,000	1	75,000	1,570,200	Apr. 24 . 1907	.01½
El Paso, g, Colo	2,500,000	2,500,000	1	.....	1,242,045	Dec. 24. . 1906	.02
Empire, z, Wis.	30,000	500	60	25,000	230,000	May 15 . 1907	10.00
Federal Sm., com., Idaho	10,000,000	60,000	100	300,000	2,073,750	Apr. 15 . . 1907	5.00
Federal Sm., pf, Idaho	20,000,000	120,000	100	210,000	2,674,250	Mar. 15. . 1907	1.75
Florence, s, Mont.	2,500,000	400,000	5	.....	223,780	Mar. 1900	.05
Frances Mohawk, g, Nev	1,000,000	910,000	1	182,000	318,500	Apr. 1. . . 1907	.10
Free Coinage, g, Colo.	1,000,000	10,000	100	.....	160,000	Dec. 1902	.20
Gemini-Keystone, Utah	500,000	5,000	100	.....	1,550,000	Dec. 1906	10.00
Gold Coin of Victor, Colo.	1,000,000	1,000,000	1	.....	1,230,000	Jan. 1903	.01
Gold Dollar Con., g, Colo	2,500,000	2,500,000	1	.....	25,000	Dec. 15. . 1906	.00½
Gold King Con., g, Colo	6,000,000	5,750,370	1	.....	1,197,334	Dec. 1905	.01
Good Hope, g, s, Colo	50,000	500	10	.....	150,000	Nov. 1906	.25
Granby Con., c., B. C.	15,000,000	135,000	100	405,000	2,158,630	Mar. 1907	3.00
Grand Central, g, Utah	250,000	250,000	1	70,000	1,228,750	May 15 . 1907	.04
Grass Valley Exploration, Calif	100,000	30,000	2	.....	30,000	Jan. 1900	.25
Greater Gold Belt, g, Colo.	5,000,000	3,800,000	1	.....	76,000	June. 1900	.02
Gwin, g, Calf.	1,000,000	100,000	100	.....	941,250	Jan. 1903	.25
Homestake, g, S. D.	21,840,000	218,400	100	436,800	16,080,350	Apr. 25. . 1907	.50
Horn Silver, g, s, c, z, l, Utah	10,000,000	400,000	25	20,000	5,602,000	Mar. 30. . 1907	.05
Imperial, c, Ariz.	5,000,000	500,000	10	200,000	300,000	June 25 . 1907	.20
Independence Con., g, Colo.	2,500,000	2,500,000	1	.....	281,375	Apr. 1901	.04
Ingham Con., g, Colo.	750,000	1,359,000	½	.....	33,981	Aug. 1901	.00¼
International Nickel, pf, U. S.	12,000,000	89,126	100	267,378	802,130	May 1. . . 1907	1.50
Iowa, g, s, l, Colo.	1,666,667	1,666,667	1	.....	405,505	Oct. 1904	.01
Iron Clad, g, Colo.	1,000,000	1,000,000	1	.....	50,000	Nov. 1906	.05
Iron Silver, Colo.	10,000,000	500,000	20	200,000	3,750,000	April 1. . 1907	.20
Isabella, g, Colo.	2,250,000	2,250,000	1	.....	742,500	Mar. 1901	.01
Jamieson, g, Calif.	3,900,000	390,000	10	23,400	84,000	Apr. 18 . 1907	.03
Katinka, g, Colo.	1,000,000	1,000,000	1	.....	10,000	Nov. 1901	.01
Kendrick & Gelder Sm., Colo.	1,000,000	1,000,000	1	.....	20,000	Dec. 1901	.01
Kendall, g, Mont.	2,500,000	500,000	5	75,000	1,290,000	May 23 . . 1907	.03
Kennedy, g, Calif.	10,000,000	100,000	100	.....	1,801,001	June. 1900	.05
La Fortuna, g, Ariz.	250,000	250,000	1	.....	1,200,500	Oct. 1902	.05
Lake City, Colo.	50,000	50,000	1	.....	63,875	May. 1900	.02
Last Dollar, g, Colo	1,500,000	1,500,000	1	.....	12,500	Dec. 1905	.01
Lexington, g, Colo	1,250,000	1,250,000	1	.....	110,857	Jan. 1906	.15
Liberty Bell, g, Colo	700,000	130,551	1	.....	331,179	June. 1906	.05
Lightner, g, Calif.	125,000	102,225	1	.....	240,000	Mar. 1903	.02

Corrected to July 5, 1907.

NAME AND LOCATION OF COMPANY.	Authorized Capital Stock.	Shares Issued.	Shares Par Val.	Dividends Paid in 1907	Dividends Total to Date.	Dividends Latest Date.	Dividends Latest Amt.
Lucky Budge, z, Mo.	40,000	400	100	.....	46,800	Apr. . . . 1905	12.00
Lyon, z, l, Mo.	50,000	4,585	10	.....	2,117	Jan. . . . 1905	.20
Mammoth, g, s, c, Utah	10,000,000	400,000	25	.....	2,140,000	Dec. 20. . 1906	.05
Mary McKinney, g, Colo.	1,500,000	1,304,252	1	78,256	801,766	Apr. 25. . 1907	.03
Midget, g, Colo.	1,000,000	1,000,000	1	.....	195,000	Apr. . . . 1902	.15
Miller, Colo.	3,000,000	30,000	100	6,000	16,500	Jan. 31. . 1907	.03
Modoc, g, s, Colo.	500,000	500,000	1	.....	270,000	Dec. . . . 1903	.01
Mohawk, c, Mich.	2,500,000	100,000	25	400,000	900,000	Jan. 10. . 1907	4.00
Monitor, Idaho	1,000,000	1,000,000	1	9,200	9,200	Feb. . . . 1907	.01
Mont. Ore Purchasing, g, s, l, Mont.	2,500,000	81,000	25	1,215,000	9,448,119	Jan. 29. . 1907	15.00
Montana Tonopah, g, Nev.	1,000,000	885,000	1	.....	131,250	Aug. . . . 1905	.10
Morning Star Drift, g, Calif.	240,000	2,400	100	.....	854,400	Sept. . . . 1900	3.00
Mt. Diablo, s, Nev.	5,000,000	50,000	100	.....	260,271	Jan. . . . 1900	.10
Mt. Rosa, g, Colo.	1,000,000	994,850	1	.....	19,897	Nov. . . . 1905	.01
Napa Con., q., Calif.	700,000	100,000	7	.....	1,800,000	Oct. . . . 1902	.10
National Lead, com, U. S.	15,000,000	150,000	100	487,500	2,128,986	July 1 . . 1907	1.25
National Lead, pf, U. S.	25,000,000	250,000	100	875,000	17,407,580	June 15 . 1907	3.75
Nevada Hills, g, Nev.	5,000,000	750,000	5	75,000	150,000	Mar. 20. . 1907	.10
Nevada Keystone, g, Nev.	1,000,000	638,877	1	.....	61,700	Feb. . . . 1904	.03
Nevada King, Nev.	1,000,000	500,000	1	10,000	10,000	Apr. 25. . 1907	.02
New Century, z, Mo.	150,000	150,000	1	7,500	200,300	May . . . 1907	.01
New Idria, q, Cal.	500,000	100,000	5	40,000	920,000	Apr. 1. . . 1907	.20
New Jersey, z, U. S.	10,000,000	100,000	100	600,000	10,200,000	May . . . 1907	3.00
New Leadville Home, g, Colo.	2,000,000	2,000,000	1	.....	265,500	Feb. . . . 1902	.05⅝
New Zealand Con., g, Colo.	1,000,000	675,000	1	.....	129,600	Mar. . . . 1902	.01
North Butte, c, g, s, Mont.	9,000,000	400,000	15	1,600,000	5,000,000	June 25 . 1907	2.00
North Star, g, Cal.	2,500,000	250,000	10	50,000	1,356,356	Mar. 28. . 1907	.20
Northern Light, g, s, Utah	2,000,000	400,000	5	.....	20,000	Feb. . . . 1904	.05
Nuggett, g, Colo.	1,000,000	991,000	1	.....	84,730	July. . . . 1901	.01
Old Colony Zinc, Mo.	1,000,000	69,909	10	.....	138,184	Nov. . . . 1901	.25
Old Gold, g, Colo.	2,101,150	2,101,150	1	.....	10,506	Mar. . . . 1904	.00½
Ontario, s, l, Utah	5,000,000	50,000	100	.....	14,962,500	Dec. . . . 1902	.30
Ophir, g, s, Nev.	302,400	100,800	3	.....	1,797,400	July. . . . 1904	.25
Osceola, c, Mich.	2,500,000	96,150	25	576,900	6,362,000	Jan. 24. . 1907	6.00
Osceola, l, z, Mo.	500,000	98,000	5	39,200	225,400	Apr. 25. . 1907	.10
Oustomah, g, Cal.	250,000	250,000	1	.....	12,500	Mar. . . . 1904	.05
Parrot, c, Mont.	2,300,000	229,850	10	114,924	6,864,720	June 19 . 1907	.25
Pennsylvania Con., g, Cal.	5,150,000	51,500	100	.....	326,125	Mar. . . . 1906	.10
Penn-Wyoming, c, Wyo.	10,000,000	5,500,000	1	137,500	531,250	Apr. 15. . 1907	.01¼
Petro, g, s, Utah.	800,000	800,000	1	.....	65,000	Aug. . . . 1906	.04
Plumas-Eureka, g, Cal.	1,406,250	150,625	10	.....	2,931,294	Apr. . . . 1901	.06
Portland, g, Colo.	3,000,000	3,000,000	1	240,000	7,387,080	Apr. 25. . 1907	.04
Quartette, Nev.	1,000,000	100,000	10	30,000	355,000	Mar. 30. . 1907	.15
Quicksilver, pf, Cal.	4,300,000	43,000	100	.....	1,931,411	May. . . . 1903	.50
Quincy, c, Mich.	3,750,000	150,000	25	1,350,000	17,945,000	June 10 . 1907	4.50
Quincy, l, s, g, c, Utah	75,000	125,000	½	.....	1,100,000	Mar. . . . 1902	1.50
Raisbeck Fairplay, z, Wis.	12,000	12,000	1	.....	1,200	June. . . . 1906	.10
Richmond, g, s, l, Nev.	1,350,000	54,000	2	.....	4,453,797	Dec. . . . 1900	.01
Red Bird, g, s, c, l, Mont.	1,500,000	300,000	5	.....	72,000	Dec. . . . 1904	.01
Red Metal, Mont.	1,000,000	100,000	10	400,000	1,200,000	Mar. 1. . 1907	4.00
Red Top, g, Nev.	1,000,000	1,000,000	1	.....	50,000	Feb. . . . 1906	.05
Rob Roy, z, Mo.	15,000	14,325	1	.....	11,969	May. . . . 1906	.03
Sacramento, g, Utah	5,000,000	1,000,000	5	.....	308,000	Dec. . . . 1906	.00½
St. Joseph, l, Mo.	20,000,000	1,000,000	10	150,000	5,138,357	Mar. 15. . 1907	.15
Santa Rita, g, Colo.	1,000,000	1,000,000	1	.....	4,000	July. . . . 1900	.02
St. Rose, z, Wis.	75,000	750	100	.....	22,500	May. . . . 1906	6.00
Shannon, c, Ariz.	3,000,000	300,000	10	150,000	450,000	Mar. 30. . 1907	.50
Silver Hill, g, s, Nev.	180,000	180,000	1	.....	82,800	Mar. . . . 1906	.05
Silver King, g, s, l, Utah.	3,000,000	150,000	20	150,000	10,900,000	Mar. . . . 1907	.33½
Silver Shield, g, Utah.	300,000	300,000	1	.....	4,500	Feb. . . . 1901	.00½
Smuggler, s, l, z, Colo.	1,000,000	1,000,000	1	.....	2,235,000	Nov. . . . 1906	.03
Snowstorm, Idaho	1,500,000	1,500,000	1	135,000	225,000	Apr. . . . 1907	.03
Southern Boy, g, Colo.	1,250,000	875,000	5	.....	17,500	May. . . . 1900	.02
Standard Con., g, s, Cal.	2,000,000	178,394	10	17,839	4,240,597	Mar. 26. . 1907	.10
Standard, c, Ariz.	500,000	400,000	1	.....	40,000	Sept. . . . 1902	.50
Stratton's Cripple Creek, Colo.	2,000,000	2,000,000	1	50,000	100,000	Mar. . . . 1907	.02½
Stratton's Independence, g, Colo.	5,500,000	1,000,007	5	.....	5,028,568	Dec. . . . 1906	.12½
Stratton's Leasing, Colo.	500,000	500,000	1	.....	50,000	Jan. . . . 1906	.10
Strong, g, Colo.	1,000,000	1,000,000	1	.....	2,275,000	July. . . . 1905	.02½
South Swansea, c, s, l, Utah.	300,000	300,000	1	.....	170,000	Apr. . . . 1904	.01
Swansea, s, l, Utah.	500,000	100,000	5	5,000	334,500	Mar. 20. . 1907	.05
Syndicate, g, Cal.	100,000	100,000	1	.....	82,000	Aug. . . . 1902	.02
Tamarack, c, Mich.	1,500,000	60,000	25	180,000	9,180,000	Jan. 24. . 1906	3.00
Tennessee, c, Tenn.	5,000,000	200,000	25	250,000	1,125,000	Jan. 28. . 1907	1.25
Tetro, g, l, Utah.	300,000	300,000	1	.....	18,000	Dec. . . . 1904	.01
Tomboy (New), g, s, Colo.	1,500,000	300,000	5	.....	1,803,000	Dec. . . . 1906	.50
Tonopah-Alpine, g, Nev.	700,000	700,000	1	.....	70,000	Dec. . . . 1903	.10
Tonopah-Belmont, g, Nev.	2,000,000	1,150,000	1	115,000	356,500	April 1. . 1907	.10
Tonopah Extension, g, s, Nev.	1,000,000	928,433	1	.....	278,530	Apr. . . . 1906	.15
Tonopah, g, s, Nev.	1,000,000	1,000,000	1	700,000	2,650,000	Apr. 22. . 1907	.35
Tonopah-Midway, g, Nev.	1,000,000	1,000,000	1	50,000	250,000	Jan. 1. . . 1907	.05
Town Topics, g, s, Colo.	1,000,000	1,000,000	1	.....	50,000	Nov. . . . 1903	.00½
Trimountain, c, Mich.	2,500,000	100,000	25	.....	300,000	June. . . . 1903	1.50
Trinity County, g, Cal.	1,000,000	99,003	10	.....	34,561	July. . . . 1903	.05
Uncle Sam Con., Utah.	500,000	500,000	1	.....	145,000	Dec. . . . 1906	.01
Union, g, Colo.	1,250,000	1,250,000	1	.....	444,244	Jan. . . . 1903	.02
United, c, pf, Mont.	5,000,000	50,000	100	150,000	1,500,000	May 15. . 1907	3.00
United, c, com, Mont.	45,000,000	450,000	100	1,687,500	5,337,500	Apr. 29. . 1907	1.75
United, z, l, pf, Mo.	1,000,000	14,556	25	14,556	196,971	Apr. 15. . 1907	.50
United, z, l, com, Mo.	5,000,000	92,400	5	.....	27,490	Oct. . . . 1903	.05
United (Cripple Creek), Colo.	5,000,000	4,009,100	1	.....	280,071	Apr. . . . 1905	.00½
United Globe, c, Ariz.	2,300,000	23,000	100	.....	299,000	June. . . . 1906	6.50
United Metals Selling, U. S.	5,000,000	50,000	100	1,375,000	4,875,000	Apr. . . . 1907	7.50
United Verde, c, Ariz.	3,000,000	300,000	10	1,125,000	22,720,322	May . . . 1907	.75
U. S. Red. & Ref., com, Colo.	6,000,000	59,188	100	.....	414,078	Oct. . . . 1903	1.00
U. S. Red. & Ref., pf, Colo.	4,000,000	39,458	100	1,183,740	1,716,749	July . . . 1907	1.50
U. S. Sm., Ref. & Mg., com, U. S., Mex.	37,500,000	750,000	50	656,250	656,250	Apr. 15. . 1907	.87½
U. S. Sm., Ref. & Mg., pf, U. S., Mex.	37,500,000	469,748	50	822,058	1,967,528	Apr. 15. . 1907	.87½
Utah, s, l, Utah	1,000,000	90,000	10	13,500	242,000	May 14 . . 1907	.03
Utah Con., c, Utah.	1,500,000	300,000	5	1,350,000	6,486,000	Apr. 15. . 1907	1.50
Victoria, g, s, l, Utah.	250,000	250,000	1	30,000	192,500	May 15 . . 1907	.04
Vindicator Con., g, Colo.	1,500,000	1,500,000	1	90,000	1,605,000	Apr. 25. . 1907	.03
Wasp No. 2, g, S. D.	500,000	147,900	1	.....	240,595	Dec. . . . 1906	.01
West Mt. Placers, Utah.	500,000	248,300	1	.....	180,390	June. . . . 1906	.01
Wolverine, c, Mich.	1,500,000	60,000	25	600,000	4,530,000	Apr. 1. . . 1907	10.00
Work, g, Colo.	1,500,000	1,500,000	1	15,000	105,000	Apr. 1. . . 1907	.01
Yak, Colo.	1,000,000	1,000,000	1	60,000	767,685	Mar. 25. . 1907	.06
Yankee Con., g, s, l, Utah.	500,000	500,000	1	15,000	167,500	Jan. 21. . 1907	.03½
Yellow Aster, c, Cal.	1,000,000	100,000	10	10,000	593,000	May 4 . . 1904	.10
Zoe, g, Colo.	500,000	1,500,000	1	.....	7,500	Dec. . . . 1900	.00

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PERFORATED METALS.
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Fairbanks, Morse & Co.
Hendrie & Bolthoff M.& S.Co., Denver.
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PIPE (SPIRAL RIVETED).
Weigele Pipe Works, Denver.

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Hendrie & Bolthoff M.& S.Co., Denver.
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Hendrie & Bolthoff M.& S. Co., Denver.
Portland Cement Co., Denver.
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John A. Traylor Machy. Co., Denver.

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John A. Traylor Machy. Co., Denver.

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Hendrie & Bolthoff M.& S.Co., Denver.
Peter McFarlane Iron Wks., Denver.
John A. Traylor Machy. Co., Denver.

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Western Elaterite Roofing Co., Denver.
John A. Traylor Machy. Co., Denver.

RUBBER BELTS.
See Rubber Goods.

(Continued on Page 29.)

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AND

The Rio Grande Western

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DENVER, - - COLORADO

BUYERS' GUIDE

(Continued from Page 28.)

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John A. Traylor Machy. Co., Denver.

RUBBER SPRINGS—SEE RUBBER GOODS.

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Colorado Iron Works Co., Denver.
Fairbanks-Morse & Co.
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John A. Traylor Machy. Co., Denver.

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Weigele Riveted Steel Pipe Works, Denver.
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John A. Traylor Machy. Co., Denver.

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Hendrie & Bolthoff M.& S.Co., Denver.
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Hendrie & Bolthoff M.& S.Co., Denver.
Peter McFarlane Iron Wks., Denver.
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Hug Water Wheel Co., Denver.
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Hendrie & Bolthoff M.& S.Co., Denver.
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(Continued on Page 32.)

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PERSONALS

Lyman W. Wakefield of Tuscon, Arizona, has just been appointed register of the land office at Phoenix, Arizona.

R. E. Cuthbertson of Denver, was a visitor at Telluride a few days ago and was favorably impressed with that growing community. He believes Telluride, as a commercial center, and her rich surrounding mineral territory, have a great future.

General William J. Palmer of Colorado Springs has made a gift of $12,000 to the School of Engineering of the Colorado College of that city, to be devoted to the purchase of additional equipment for the engineering laboratories for senior work.

Fred Hoar, formerly superintendent of the Old Dominion Copper Company, Globe, Arizona, has been appointed superintendent of the Lake Superior and Arizona Copper Company, whose properties are at Florence, Arizona.

S. W. Clawson, for many years connected with the Copper Queen Consolidated Mining Company, as superintendent, whose properties are in Cochise county, Arizona, has tendered his resignation to take effect September 1st. Mr. Clawson has been connected with Copper Queen Company for nearly a quarter of a century in various positions and will retire to care for private interests. He has long been considered one of the ablest practical mining men in the west.

The Geological Survey will soon establish a station in Pittsburg, Pennsylvania, for the purpose of experimenting to prevent explosions in mines, more especially coal mines. They will endeavor to adopt some method to prevent explosions by what is commonly called "fire damp," and thus prevent these frequent accidents and appalling loss of life.

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Assaying, Aaron's—Part I., Gold and Silver Ores. Sixth edition; rewritten and improved; 143 pp., illustrated $1.00
Assaying, Aaron's—Part II. and III., Gold and Silver bullion, Lead, Copper, Tin, Mercury. Fourth edition, revised and rewritten; new type; new illustrations; new matter $1.50
Assaying, Notes on.
290 pp.; Ricketts and Miller, $3.00
Assaying with the Blowpipe, Quantitative.
E. L. Fletcher; 140 pp. $1.50
Manual of Practical Assaying.
H. Van F. Furman, 463 pp. ..$3.00
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W. L. Brown $2.50

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Chemical Arithmetic, Elementary, 1100 Problems.
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Alfred A. Blair, 319 pp. $4.00
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Ira Remsen; 270 pp. $0.80
Elementary Textbook of Chemistry.
Mixter; 440 pp. $1.50
Inorganic Chemistry.
J. I. D. Hinds.....$3.00
Inorganic Chemistry for Beginners.
Roscoe and Lunt; 150 pp. ..$0.75
Manual of Quantitative Chemical Analysis.
Ladd; 82 pp. $1.00
Manual of Qualitative Chemical Analysis.
Fresenius; 748 pp. $5.00
Organic Chemistry.
Richter; 2 vols. $6.00
Pocket Book for Chemists.
Thos. Bayley; 200 pp. $2.00
Quantitative Chemical Analysis.
T. E. Thorpe; 160 pp. $1.50
Volumetric Analyses.
F. Sutton; 400 pp. $5.00

MINERALOGY.

Minerals—How to Study Them.
Edw. S. Dana; 380 pp. $1.50
Mineralogy.
Edw. S. Dana $4.00
Textbook of Mineralogy.
Dana; 592 pp. $4.00

Stock Quotations

(Continued from Page 22.)

ies for whom it sells. If Mr. Paine, for the Copper Range Company, or Mr. Bigelow, for the Osceola and Tamarack Companies, desire that copper shall be sold at a concession, the concession will be made. There can be no question but that the demand is increasing faster than new sources of supply."

Stocks	Bid	Ask.
Adventure	03	03¼
Arcadian	07	07⅛
Allouez	45	47½
Atlantic	13½	14
Bingham	15½	....
Balaklala	10⅜	10¾
Butte Coalition	....	24¾
Calumet & Hecla	8.20	8.30
Calumet & Arizona	....	169
Centennial	29	30
Copper Range	83	83¼
Daly-West	16	16½
Kranklin	15½	16
Isle Royale	21½	21¾
La Salle	15	15½
Mass	05½	05⅞
Michigan	14	15
Mohawk	84	84¾
North Butte	84½	84¾
Old Dominion	48⅝	48¼
Osceola	134	135
Parrot	21½	....
Quincy	119¼	120
Shannon	18	18⅛
Tamarack	114	115
Trinity	28	28½
United Copper	63	64
U. S. Smelting	48¾	49
U. S. Smelting pfd	42¾	43
Utah Cons	52¾	53¼
Victoria	07⅝	08
Winona	08¼	08¾
Wyandot	01⅛	01¼
Wolverine	160	....
Newhouse	16¾	17

Metals

July 3—

Bar Silver	67⅜
Copper (New York)	23.25@24.00
Lead (St. Louis)	5.60@5.62½
Spelter (St. Louis)	5.62½@5.67½

QUICKSILVER MINING.

Quicksilver Mining Company's report for the year ended April 30, 1907, compares as follows:

	1907.	1906.
Gross	$107,204	$114,995
Expenses	94,151	108,704
Net	$ 13,053	$ 6,291
Depreciation	8,419	.....
Appreciation	.....	9,058
Net surplus	$ 4,634	$ 15,349

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Merritt $1.50
Gold Mining Business, Organization of.
Brown $10.00
Hydraulic and Placer Mining.
Wilson; 235 pp. $2.00
Hydraulic Gold Mining.
Kirkpatrick; 46 pp. $1.00
Mine Ventilation.
Wilson; 150 pp. $1.25
Miner's Handbook.
Milne; 440 pp. $3.00
Miner's Pocket Book.
Powers; 500 pp. $3.50
Miner's Pocket Book.
Lock; 474 pp. $4.00
Manual of Minerals, Mines and Mining.
Osborn; 369 pp. $4.50
Mine Examiner and Prospector's Companion.
Miller; 387 pp. $3.00
Mining Rights.
Morrison $3.00
Ore Dressing.
Richards; 2 vols.; 1220 pp., $10.00
Prospector's Field Book and Guide.
Osborn; 310 pp. $1.50
Prospector's Hand Book.
Anderson; 176 pp. $1.50
Prospecting, Locating and Valuing Mines.
Stretch Cloth $2.00
Pocket, Flexible Leather....$2.50
Practical Hand Book for Miners.
Miller; 234 pp. $3.00
Practical Mining.
Murphy $1.00
Practical Surveyor's Guide.
Duncan; 214 pp. $1.50

At the annual meeting of the stockholders of the Quicksilver Mining Company, W. A. M. Burden and C. H. Dickinson were elected directors to succeed Sheppard Gandy and Joseph Milbank. The other directors were re-

BUYERS' GUIDE

(Continued from Page 29.)

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2—70 H.P. 54x16 Horizontal Tubular.
4—60 H.P. 54x14 Horizontal Tubular.
1—50 H.P. 48x16 Horizontal Tubular.
2—50 H.P. 54x12 Horizontal Tubular.
1—40 H.P. 44x14 Horizontal Tubular.
1—40 H.P. 48x12 Horizontal Tubular.
1—30 H.P. 42x12 Horizontal Tubular.
1—25 H.P. 42x10 Horizontal Tubular.
1—20 H.P. 36x10 Horizontal Tubular.
1—12 H.P. 30x8 Horizontal Tubular.
1—15 H.P. 30x10 Horizontal Tubular.
1— 8 H.P. 24x7 Horizontal Tubular.
1—40 H.P. 48x7 Vertical.
1—40 H.P. 48x9 Vertical.
1—20 H.P. 46x5½ Vertical.
2—14 H.P. 36x7 Vertical.
1—12 H.P. 33x7½ Vertical.
1—10 H.P. 33x7 Vertical.
1— 8 H.P. 24x7 Vertical.

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24x42x48 Hamilton Cross Compound.
18x34x48 Allis Cross Compound.
18x42 250 H.P. Fraser & Chalmers Corliss, L. H.
14x36 125 H.P. Allis Corliss, R. H.

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13x17x23 McIntosh-Seymore Tandem Compound Engines.
14x20 120 H.P. Atlas Center Crank.
3—13x12 100 H.P. Ball Center Crank.
10x12 65 H.P. Ball Center Crank.
11x10 50 H.P. Westinghouse Center Crank.
9½x10 5 H.P. Armington-Sims Center Crank.

Vertical Automatic.

3½x4½ 5 H.P. A. B. C. Center Crank.

Horizontal Slide Valve.

7x12x9x12 American Cross Comp.
9x12x12 American Tandem Comp.
7x10x12 American Tandem Comp.
14x20 70 H.P. Atlas R. H.
8x10 20 H.P. Nagle Center Crank.
7x10 15 H.P. Atlas Center Crank.
7x10 15 H.P. Ames Center Crank.
6x 8 12 H.P. Nagle Center Crank.

Vertical Engines.

10x8 20 H.P. Colorado Iron Works.
6x6 7 H.P. O. & S.
5x6 6 H.P. Clark.
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FOURTEENTH YEAR WEEKLY ESTABLISHED 1893

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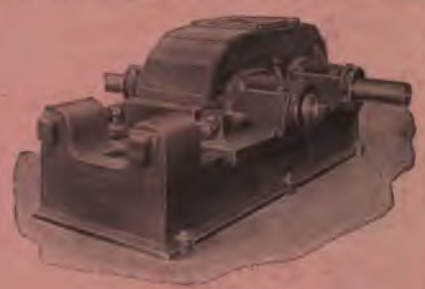

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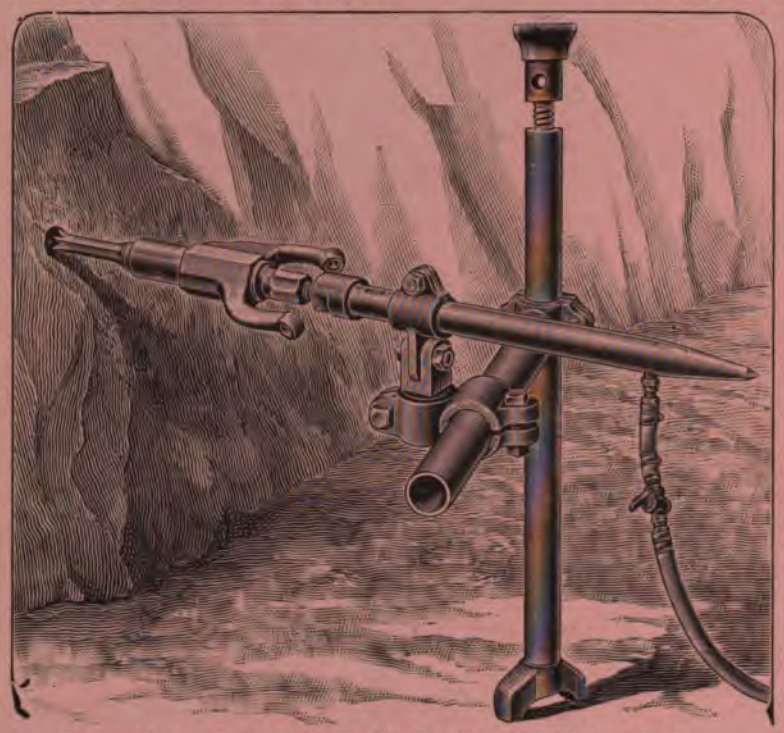

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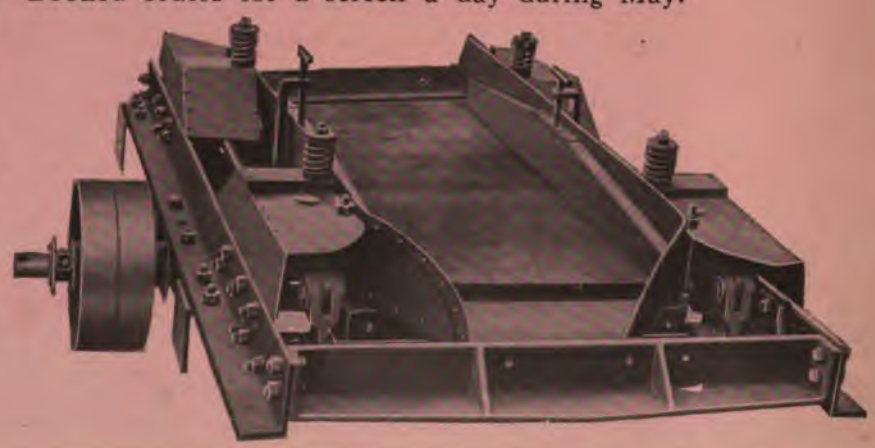

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MINES AND MINING

WEEKLY

Vol. XIV Denver, Colorado, July 26, 1907 No. 16

MINES AND MINING

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Does Deep Mining Pay?

A Black Hills miner says mining men are beginning to recognize the fact that what the miners of that section need, to a great extent, is deep mining.

In Colorado we have mines that are heavy and profitable shippers whose ore bodies are at depths varying from 500 to over 3,500 feet. Some of the deepest workings of the Revenue mine, Mount Sneffels district, Ouray county, are over 3,500 feet. The Bobtail, Gunnell, Gregory and others of Gilpin county, are in rich gold ore at depths of 1,000 to 2,000 feet. In Clear Creek county there are the Dives-Pelican, Mendota, Terrible, Stanley, Newhouse tunnel and twenty more that are turning out profitable ore whose depths are 500 to over 2,000 feet vertically beneath the surface. Some of the deepest and richest workings of the Leadville district are 1,500 to 2,000 feet.

Cripple Creek is comparatively a new district, yet they have several mines that are from 1,000 to 1,500 feet deep. The deepest workings of the Portland are over 1,500 feet, the Independence 1,400, Gold Coin 1,250, and a dozen others from 700 to 1,200 feet. The deep drainage tunnel now being driven will connect some of these mines at depths of over 2,000 feet. Deep mining pays. At great depth the ore bodies are usually found in mass and position. Some of the reef mines of South Africa are now from 2,000 to 3,000 feet deep and the ore has to be lifted. The greater portion of our deep mining is by tunnels with the law of gravitation to help do the work.

A score of mines in the great San Juan are from 1,000 to 2,000 feet deep, and at those depths they find their most extensive, permanent and continuous ore bodies. There is not a district in the state that can not show profitable, productive mines at depths of 500 to 1,500 feet. It is conservative to state that in Colorado there are more than 100 producing mines that have attained depths of 500 to 2,500 feet.

On the great Bachelor vein at Creede there are a half dozen mines that are 1,000 to 1,500 feet deep. The Yankee Girl, Guston, Genesee-Vanderbilt, National Belle and perhaps two or three more in the Red Mountain district of Ouray county are down 900 to 1,250 feet. In San Juan county the Silver Lake, Gold King, Sunnyside, North Star, Grand Mogul, Champion, Henrietta, Hercules Consolidated, and a dozen more are in rich ore 500 to 1,700 feet beneath the surface.

On the San Miguel side we may mention the Smuggler-Union, Tomboy, Japan, Liberty Bell, Black Bear, Gold King, Suffolk, Butterfly-Terrible, Cariboo, Silver Pick and other profitably productive properties with depths varying from 700 to 2,000 feet.

The Black Hills miners need not be afraid to go down, as the ore bodies may be as deep as the earth. The Homestake's deepest workings are about 1,500 feet, Holy Terror 1,250, and there are several other Black Hills mines with depths of from 500 to 1,000 feet. There are probably many mines in the Black Hills that will pay at depths of 1,000 to 2,000 feet.

The Practical to Be Introduced

The State School of Mines at Golden is pursuing the right course by introducing practical mining in connection with their studies. The students have started to drive a tunnel on the south slope of Mount Zion; about a half mile west of Golden, and after driving some 500 feet they purpose sinking a shaft, stoping, drifting, upraising, crosscutting, or anything else that may constitute a fully equipped mining enterprise of this character. Each student will have regular days to work in the mine and have opportunity to learn all branches. It is believed this will prove decidedly popular with the students, as well as lighten the duties of professors in teaching the theoretical side of mining.

Lines for the transmission of electric power are being run and electric trams, air drills, blowers and other necessary machinery will be installed. It is proposed to make the School of Mines mine a model from which old-time mining men may get useful pointers.

Aside from the great benefit to the men of the school in acquiring knowledge of practical mining, there is a possibility that the mine may develop into a paying proposition from a commercial standpoint. It is known that

this region contains much copper ore, and some samples taken have carried considerable gold. Henry Koch, a pioneer prospector, has done considerable work within a few hundred feet of the proposed school mine, and has a small vein of rich copper-bearing rock. He has for years contended that deep sinking will disclose a large vein, but has never been able to secure sufficient capital to carry on the work. A year's work by students of the School of Mines will probably show whether or not the old prospector's predictions were correct.

A Vast Deposit of Magnesia

Another mining sensation comes from Nevada. L. J. Mountz, a Denver mining man, claims to have located a vast deposit of magnesia rock, believed to be millions of tons. Mr. Mountz says the deposit is in the northern part of Nevada on government land. The deposit is said to be several hundred feet wide, 2,500 feet long and of unknown depth. Mr. Mountz says they have sunk several holes fifty feet deep and found the pure article all the way down. They are not yet through the flat or horizontal deposit.

The rock is used for making face powder, for soaps, various chemical purposes, polishing silverware and dozens of other purposes.

"As yet," says Mr. Mountz, "we do not know what we will do with the property. Ultimately we hope to build a factory in Denver to handle it. In fact, the experts tell us that so many things can be done with the stuff that we may build more than one factory, so that we will be able to turn out different products.

"But just think of all this natural face powder lying idle out there in Nevada, with all the women of the United States just dying to get hold of face powder."

Mr. Mountz says that the deposit is situated twelve miles from a railroad, and that it will be an easy matter to transport it.

The discovery was made by a prospector sent by Mr. Mountz to find a possible gold mine. He did not find the gold mine, but Mr. Mountz says that he is satisfied that something better than a gold mine was discovered. "I think it is worth a good many gold mines," he says.

"If this were a gold mine or a silver mine," continued Mr. Mountz, "we would know just what to do with it. But we are in the same position as the men who discovered elatorite in Utah. They did not know what to do with it. The thing was new to them. This magnesia is new to us, but, with the customary American spirit, we are accumulating all of the magnesia property we can get hold of, and will keep the exact location of the place a secret until we are certain that there is no more magnesia rock in that part of Nevada.

"This is the only magnesia deposit of any consequence that I know of in the United States. At the present time face powders and other things are manufactured from various products at a high cost. We expect to place our stuff on the market at a small outlay, because of the purity of the deposit."

Gunnison Connty Marble

The marble beds located near Marble City, Gunnison county, are becoming noted all over tnis country. A strong company has been organized, extensive plants put in, and probably the greatest marble works in the world will be in operation there within the next five years. The supply is comparatively inexhaustible and the quality is not surpassed anywhere. We hear of the beautiful white Parian marble, the mottled Egyptian marble, Grecian marble, the famous Italian marble, the Vermont marble that has been on the market for 100 years, but in ten years Colorado marble will eclipse them all in quantity, quality, pure white, variegated colors and durability.

A railroad eleven miles in length has already been built from Redstone to Marble City, and preparations are going forward for handling an immense tonnage. Up to the present time expenditures will amount to nearly $1,000,000, and the work of development and equipment goes steadily on. The railroad is to be extended from Marble City to the works, but a few miles distant, and the entire enterprise put on the basis of heavy production and shipments.

A party of eastern capitalists who are interested in the works were out here last week under the escort of D. Platt Osborne of the Knickerbocker Syndicate, New York. They were highly pleased with the property and Mr . Osborne remarked that they wouldn't take $20,000,000 for their marble in its native bed.

The association is styled the Colorado-Yule Marble Company, and a power plant has already been put on at a cost of $60,000, and other extensive improvements are under way. A mill has been built at a cost of $75,000 to saw, channel and polish the marble, and will be put in operation as soon as the power plant starts. We are quarrying at the rate of 1,500 feet a day, and expect to quarry 3,000 feet a day in a couple of months," says Mr. Osborne.

"We have already spent nearly a million dollars in development work. A railroad eleven miles long, from Redtone to Marble City, has been built at a cost of $118,000. The work of quarrying has been expensive, and the construction of a power house and mill has cost a lot of money. A town is being established at Marble. When we went in there only about 100 people lived in the palce; now there are 500 people, and the population is increasing as our output increases.

"The marble quarries in Vermont are becoming exhausted, and in some places they have gone down 200 feet to get it. With us the marble is above ground. There is a mountain of the material, and all we have to do is to quarry it. We can lay white marble down in New York, including the cost of production and freight charges, at $1.47 a cubic foot. I guess that is reasonable enough to suit most people."

Mr. Osborne has been in Colorado for more than a week with a party of eastern men, who have money invested in the Colorado-Yule Marble Company. Among those with Mr. Osborne are Henry J. Utz of Utz & Dunn, Rochester, New York, shoe manufacturers; John R. Wheeler, an attorney of Pittsburg, Pennsylvania, and others. Mortimer Matthews of Cincinnati was here recently to look over the quarries.

J. F. Manning, a former state senator of Vermont, who for twenty-five years has been interested in the marble business, has moved to Marble City with his family and will have charge of the sales department of the marble company.

Max J. L. Towler, a practical engineer, formerly manager of the Detroit Bridge Company, took charge of the affairs of the Colorado-Yule Marble Company on July 1st.

The principal directors of the company are: H. P. Pope, first vice president of the Carnegie Steel Company; J. E. Patterson of Wilkesbarre, Pennsylvania; Prof. C. F. Brackett, director of electrical engineering at Princeton University; Benjamin Douglas, tunnel engineer of the Detroit River Tunnel Company; Col. William M. Price, at attorney of Wilkesbarre, Dr. William J. Chandler, secretary of the Medical Society of New Jersey, Orange, New Jersey, and F. B. Downing, director of the Erie Transit Company, Erie, Pennsylvania.

It is reported that a large deposit of remarkably pure stibnite is located in Southern Utah, and is shortly to be worked.

Wooden-Stave Pipe*

By Andrew Swickard.

During an early period of the growth of some of our eastern cities, extensive water systems were installed, using as distributing mains small logs of trees with auger holes bored lengthwise. The limitations of such a plant were many, and as soon as necessity required and circumstances permitted, pipes made of iron were used. The next stage in the use of wood in constructing water pipe is found in the New England states. Pipes of large diameter and made of wooden staves banded together with flat iron bands were used in a number of instances for carrying water from dams to water wheels. These were made up in sections of twelve to sixteen feet in length, and the sections were so tapered that the small end of one entered into the large end of the adjoining section, forming a telescope joint. Pipe so constructed served the purpose well. A few of these old pipes were still in use a few years ago. In one case, at least, the pipe was in service nearly fifty years before being rebuilt.

Beginning of Modern Construction.

The first wooden pipe built according to the present method was installed by the Denver Union Water Company, at Denver, Colorado, about twenty-five years ago. According to the modern method the diameter is uniform throughout, and the pipe is made continuous. The staves are milled so that the edges conform to radial lines and the sides to circles corresponding with the inside and outside radii of the pipe. Lengthwise across the end of each stave, slots are uniformly cut. When the end of two staves are butted together, during construction, a metallic clip that fits tightly in all directions is inserted in the slot.

Bands of iron or mild steel (round, not flat), are used to bind the staves together. The bands are spaced to withstand the pressure. The spacing may vary throughout the entire length of a pipe, from 10 to 12 inches to 1 or 1¼ inches center to center. The strain produced in the bands usually determines the spacing, but for a few sizes of pipe the bearing surface under the bands is the controlling element. For this reason it is not safe for one to undertake to design a wooden pipe unless he is familiar with all the factors that enter into the problem.

*From the California Journal of Technology.

Decay.

The great enemy of wood pipe is decay. If it could be controlled absolutely, the life of wooden pipe would depend entirely upon the life of the bands. In every locality there are local conditions that either hasten or retard the decay of wooden pipe. These local conditions can not, as a general thing, be controlled in any way. When understood, they can sometimes be met when the pipe line is located.

Decay is a vegetable growth and is communicable. A small amount of moisture, among other things, is necessary for decay to take place. Thoroughly dried wood, or wood constantly submerged in water, will not decay. The moisture conditions in the staves of a pipe carrying water never correspond with either of these two extremes, unless the pipe is laid below the surface of the ground water.

The degree of saturation of the staves of a pipe depends upon the pressure; as the pressure increases the condition becomes less favorable for decay. The pressure can be varied at will by the designing engineer of a water system, and as a consequence the moisture condition of the staves is the only element effecting decay that can at all be controlled. In all existing pipe lines where decay has taken place it began at points where the pressure was the lowest. Even the lowest practical pressure will produce a moisture condition in the staves that is not the most favorable to the growth of decay.

The High Points.

When decay takes place quickly and rapidly at the points when the pipe is near the hydraulic grade line, it is safe to conclude that the pipe is not running full at these points. When a pipe is installed for the purpose of supplying a town or city with water, a larger pipe than is necessary for the present needs of the community is usually built. If the quantity of water carried is regulated at the upper end, and is less than the maximum capacity of the pipe, the high points of the pipe, if the profile is irregular, will run only partly full of water. (By high points is meant the points on the profile that are near the hydraulic grade line.) Decay will take place quickly and rapidly at these points.

The pipe line of the city of Astoria, Oregon, is an illustration of a case of this kind. The profile of the line is very irregular; approaching close to the hydraulic grade at a number of points. After about ten years of service it was necessary to rebuild short sections at these high points. It is a fact, without doubt, that the pipe did not run full at all times. The staves were thus allowed to dry sufficiently to produce a moisture condition more favorable to decay. This same effect will be produced by the accumulation of air at the high points if means are not provided for allowing it to escape.

When a pipe is built in a locality where there is much decaying wood scattered on the surface of the ground, or where there is much vegetable matter in the soil, it is well to make the moisture condition of the staves more unfavorable to decay by keeping the pressure at all points considerably above that due to a head of a few feet only. (Make the minimum, say forty or fifty feet.)

Areas overgrown with willows or other trees or shrubbery require that much water should be avoided if possible in locating a wooden pipe line. Roots from such trees or shrubbery will entwine about the pipe in great masses and actually seem to kill the wood. Where conditions of this kind prevail pipe will last but a comparatively short time.

Selection of the Wood.

The selection of a wood of which a pipe is to be built is an important matter. It is necessary to have staves long and straight grained. On this coast there are but two kinds of trees that furnish lumber suitable for pipe construction. These are the redwood of California and the Douglas spruce or fir of the Northwest. The choice between these two should be the one that resists decay the best, even though the lumber with the best resisting quality costs the most. It has been claimed that if the staves of a pipe are always saturated they will never decay. They are never thoroughly saturated. The degree of saturation depends upon the pressure, and the growth of decay is in inverse ratio to the degree of saturation. As a consequence, the staves are always more or less subject to decay, and it seems to be an act of wisdom to select the wood that resist decay best.

Wood pipe is, as a general thing, much cheaper and more economical than riveted steel pipe. Where the pipe is to be subjected to a comparatively high pressure (say 250 feet head or over) it might be cheaper to build of steel. There are so many variable elements due to locality that enter into the cost of pipe that it is difficult to make comparisons. As a general thing wood pipe is from thirty to fifty per cent. cheaper than riveted steel.

The interior of a wooden pipe will not deteriorate as does that of an iron pipe. From the standpoint of steady

capacity the wood is far superior to iron. Not many careful experiments have been made on the flow in wooden pipe. The results are not materially better than those obtained by experiments on the flow in new, smooth iron pipe.

Wider Use in Prospect.

The comparatively early deterioration of two or three existing pipe lines has been used as a premise for arriving at the conclusion that wooden pipe is a failure. Where there is one pipe line that has been a partial failure (there are no absolute failures) there are dozens that are giving the utmost satisfaction. Each partial failure has been due to local causes which might have been avoided is they had been understood. It is well known that iron pipe gives under some conditions the greatest satisfaction, while under others it is very unsatisfactory.

The use of wood pipe has been greatly extended in recent years. A number of long lines have been built in the East during the past two years. It is even attracting attention in Europe. The use of wooden pipe on a large scale was decidedly a western innovation. After a time demonstration of its worth it has found favor with the engineers of the East. At least in one case wood pipe has been favorably considered by conservative English engineers. This is in connection with a large water project in India. Recently a number of inquiries have come from Japan for detailed information relative to design and cost, and even Siberia is getting into line. Up to the present time, installations have been made in America, from Alaska to Peru, inclusive. Time has proven its worth, and under certain necessary limitations, a more extensive general use is assured.

Copper Output in the United States

By L. C. Graton.*

The production of copper in the United States in 1906 was 906,591,947 pounds. This is an increase of about 18,000,000 pounds, or two per cent. over 1905 compiled on the same basis, and is a new record. The total is made up of Michigan's production of refined Lake copper and of the fine copper content of blister. In the following table the production is apportioned to the states in which the copper was mined:

—	Pounds Fine.
Alaska	8,685,646
Arizona	262,566,103
California	28,153,202
Colorado	7,427,253
Georgia	17,182
Idaho	8,578,046
Massachusetts	9,744
Michigan	229,695,730
Missouri	54,347
Montana	283,485,517
Nevada	1,090,635
New Mexico	7,099,842
North Carolina	582,209
Oregon	545,859
Tennessee	17,809,442
Texas	51,377
Utah	50,329,119
Vermont	11,694
Washington	290,823
Wyoming	106,177
Total	906,591,947

*Preliminary statement, U. S. Geol. Survey. Subject to revision.

About 50,000,000 pounds of the total of 906,591,947 pounds was reported by three companies in the form of electrolytic instead of blister and ordinary Lake ingot copper. To compensate for the loss in its refining there is added pro rata to the states concerned 900,000 pounds, that being the approximate copper content of the bluestone recovered in the production of this electrolytic copper. No allowance can be made for the probable small difference between the quantity of these companies' pig and anode copper in transit to the refinery during the latter part of 1905 and the quantity in transit during the corresponding period of 1906.

Of the total 906,591,947 pounds, 816,386 pounds in blister were produced in foreign smelters from materials exported from the United States. In addition to the total given, 54,543,116 pounds were produced as blister in domestic smelters from foreign ore, concentrates and matte, while blister imported from foreign sources containing 136,826,906 pounds fine copper was electrolytically refined in this country.

The production of electrolytic copper in the United States, based on actual returns from all refineries, was as follows: From materials of domestic origin, 648,614,592 pounds; from materials of foreign origin, 191,370,022 pounds; total, 839,984,614 pounds.

The figure for domestic production includes 24,017,833 pounds. Lake copper which was refined electrolytically and an indeterminate but very small quantity recovered from scrap.

The production of domestic non-electrolytic copper refined by the furnace process and known as casting copper amounted in 1906 to 28,345,263 pounds. This does not include Lake copper.

The total production of refined copper of domestic origin is shown in the table below:

	Pounds.
Lake (excl. Lake electrolytic)	205,608,328
Electrolytic, domestic	648,614,592
Casting	28,345,263
Total refined	882,568,237

Complete returns show that the following stocks were on hand at the Lake and electrolytic refineries at the end of the year:

	Pounds.
January 1, 1906	118,244,028
January 1, 1907	92,470,792
Stocks depleted during 1906	25,773,236

These figures do not include undelivered sales. Stocks carried by consumers have not been estimated. In addition to these stocks at refineries, there was at smelters or in transit to refineries blister copper to the amount of 110,000,144 pounds on January 1, 1906, and 100,630,245 pounds on January 1, 1907.

The apparent consumption of refined copper in the United States in 1906 was about 680,000,000 pounds, as compared with about 600,000,000 pounds in 1905. One method of deriving this figure is shown below:

	Pounds.
Total domestic refined copper produced in 1906	882,568,237
Imports for consumption, foreign origin	†215,402,841
Stock at refineries January 1,	
Total available supply	1,216,215,106
Exports	446,750,711
Stock at refineries January 1, 1907	92,470,792
Total withdrawn from supply	539,221,503
Apparent consumption	676,993,603

This is in addition to the quantity, perhaps as much as 50,000,000 pounds, which was recovered from old copper, drosses, residues, etc, and re-entered the market, mostly in the form of casting copper.

This report is based on returns made confidentially to the United States Geological Survey by every known reduction company, which in 1906 treated copper-bearing material from primary sources of origin in this country. No attempt has been made to compile statistics covering the copper from secondary sources, such as scrap, drosses, etc., which was recovered and entered the trade during the year.

The figures presented here are smelter and refinery figures and represent the actual recovery, in terms of blister and refined copper, respectively, from the materials treated in 1906. These figures may not exactly correspond with those relating to mine production during the same period, although the variation is usually not great. The smelter production and the mine production, representing as they do different steps in the process of producing copper, should not be confused.

†Figures furnished by the Bureau of Statistics and reduced to terms of refined copper. The assumption must be made that this entire amount of foreign imports, less a very small quantity reexported, is converted into refined copper within the year. Computation by a wholly different method, from independent data, which give the available supply as 1,225,570,885 lbs. and the apparent consumption as 686,349,382 lbs., show that this assumption is justified and leads to a result that is practically correct.

Analysis of Iron*

At the annual convention of the Association in 1905, this committee reported a method for the determination of silicon in iron, and last year added methods for determining total carbon and sulphur. The committee now adds methods for determining graphitic carbon, manganese and phosphorous, thus including all the determinations usually made on iron in which occasion for difference between the buyer and seller is apt to arise. This report will therefore include all the methods decided upon.

We would also like to call attention to the following quotation from the report of 1905, which indicates the intentions of these methods:

"In recommending the above method it was recognized that it is almost an impossibility to get chemists to use a standard method in their daily work. Hence the above method, as recommended, is intended primarily as a check method in case of dispute between laboratories, or as between buyer and seller.

"Hence a method, accurate in every point, was sought, shortness being sacrificed to some extent to insure accuracy or the chance of error by a careless operator. Little in the above is left to the judgment of the chemist.

"It will be further recognized that in the purchase and sale of pig iron or castings under specification, that standard methods are essential in order to allow the parties of both parts to make their determinations with the assurance that, on the score of method, they are on the same footing."

We wish also to emphasize the ideas involved in the selection of members of this committee—that is, to have representatives from commercial laboratories as well as works of chemists, and to have members from different sections of the country. The success in carrying out these ideas will be seen by the following list of members:

Andrew A. Blair, Booth, Garrett & Blair, Philadelphia.
H. E. Diller, chemist, Western Electric Co., Chicago.
H. E. Field, metallurgical engineer, Mackintosh, Hemphill & Co., Pittsburg.
R. F. Flinterman, chief chemist, McCormick division, International Harvester Co., Chicago.
Allen P. Ford, metallurgist, Eaton, Cole & Burnham Co., Bridgeport, Conn.
J. O. Handy, chief chemist, Pittsburg Testing Laboratory, Pittsburg.
J. R. Harris, chief chemist, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
H. C. Loudenbeck, chief chemist, Westinghouse Air Brake Co., Pittsburg.
R. S. MacPherran, chief chemist, Allis-Chalmers Co., Milwaukee.
W. G. Scott, chief chemist, J. I. Case Threshing Machine Co., Racine, Wis.
Henry Souther, Henry Souther Engineering Co., Hartford, Conn.
Prof. Thomas B. Stillman, Stevens Institute of Technology, Hoboken, N. J.

Determination of Silicon.

"Weigh 1 gramme of sample, add 30 c.c. nitric acid (1.13 sp. gr.); then 5 c.c. sulphuric acid (conc.). Evaporate on hot plate until all fumes are driven off. Take up in water and boil until all ferrous sulphate is dissolved. Filter on an ashless filter, with or without suction pump, using a cone. Wash once with hot water, once with hydrochloric acid and three or four times with hot water. Ignite, weigh, and evaporate with a few drops of sulphuric acid and 4 or 5 c.c. of hydrofluoric acid. Ignite slowly and weigh. Multiply the difference in weight by .4702, which equals the per cent. of silicon."

Determination of Sulphur.

Dissolve slowly a 3-gram sample of drillings in concentrated nitric acid in a platinum dish covered with an inverted watch glass. After the iron is completely dissolved, add 2 grams of potassium nitrate, evaporate to dryness and ignite over an alcohol lamp at red heat. Add 50 c.c. of a 1% solution of sodium carbonate; boil for a few minutes, filter, using a little paper pulp in the filter if desired, and wash with a hot 1% sodium carbonate solution. Acidify the filtrate with hydrochloric acid, evaporate to dryness, take up with 50 c.c. of water and 2 c.c. of concentrated hydrochloric acid, filter, wash, and after diluting the filtrate to about 100 c.c., boil and precipitate with barium chloride. Filter, wash well with hot water, ignite and weigh as barium sulphate, which contains 13.733% of sulphur.

Determination of Phosphorous.

Dissolve 2 grams sample in 50 c.c. nitric acid (sp. gr. 1.13). add 10 c.c. hydrochloric acid and evaporate to dryness. In case the sample contains a fairly high percentage of phosphorous it is better to use half the above quantities. Bake until free from acid, redissolving in 25 to 30 c.c. of concentrated hydrochloric acid, dilute to about 60 c.c., filter and wash. Evaporate to about 25 c.c., add 20 c.c. concentrated nitric acid, evaporate until a film begins to form, add 30 c.c. of nitric acid (sp. gr. 1.20) and again evaporate until a film begins to form. Dilute to about 150 c.c. with hot water and allow it to cool. When the solution is between 70° and 80° C., add 50 c.c. of molybdate solution. Agitate the solution a few minutes, then filter on a tarred Gulch crucible having a paper disc at the bottom. Wash three times with a 3% nitrate acid solution and twice with alcohol. Dry at 100° to 105° C., to constant weight. The weight multiplied by 0.0163 equals the per cent. of phosphorous in a 1-gram sample.

To make the molybdate solution add 100 grams molybdate acid to 250 c.c. water, and to this add 150 c.c. ammonia; then stir until all is dissolved and add 65 c.c. nitric acid (1.42 sp. gr.). Make another solution by adding 400 c.c. concentrated nitric acid to 1100 c.c. water, and when the solutions are cool, pour the first slowly into the second with constant stirring and add a couple of drops of ammonium phosphate.

Determination of Manganese.

Dissolve 1.1 grams of drillings in 25 c.c. nitric acid (1.13 sp. gr.), filter into an Erlenmeyer flask and wash with 30 c.c. of the same acid. Then cool and add about ½ gram of bismuthate until a permanent pink color forms. Heat until the color has disappeared, with or without the precipitation of manganese dioxide, and then add either sulphurous acid or a solution of ferrous sulphate until the solution is clear. Heat until all nitrous oxide fumes have been driven off, cool to about 15° C.; add an excess of sodium bismuthate—about 1 gram—and agitate for 2 or 3 minutes. Add 50 c.c. water containing 30 c.c. nitric acid to the liter, filter on an asbestos filter into an Erlenmeyer flask, and wash with 50 to 100 c.c. of the nitric acid solution. Run in an excess of ferrous sulphate and titrate back with potassium permanganate solution of equal strength. Each c.c. of N-10 ferrous sulphate used is equal to 0.10% of manganese.

Determination of Total Carbon.

This determination requires considerable apparatus; so, in view of putting as many obstacles out of the way of its general adoption in cases of dispute your committee has left optional several points which were felt to bring no chance of error into the method.

The train shall consist of a pre-heating furnace containing copper oxide (Option No. 1) followed by caustic potash (1.20 sp. gr.), then calcium chloride, following which shall be the combustion furnace in which either a porcelain or platinum tube may be used (Option No. 2). The tube shall contain 4 or 5 inches of copper oxide between plugs of platinum gauze, the

*Presented at Philadelphia Meeting, American Foundrymen's Association, May, 1907.
Report of Committee on Standard Methods for Analysis of Iron.

plug to the rear of the tube to be at about the point where the tube extends from the furnace. A roll of silver foil about 2 inches long shall be placed in the tube after the last plug of platinum gauze. The train after the combustion tube shall be anhydrous cupric sulphate, anhydrous cuprous chloride, calcium chloride, and the absorption bulb of potassium hydrate (sp. gr. 1.27) with prolong filled with calcium chloride. A calcium chloride tube attached to the aspirator bottle shall be connected to the prolong.

In this method a single potash bulb shall be used. A second bulb as sometimes used for a counterpoise being more liable to introduce error than correct error in weight of the bulb in use, due to change of temperature or moisture in the atmosphere.

The operation shall be as follows: To 1 gram of well-mixed drillings add 100 c.c. of potassium copper chloride solution and 7.5 c.c. of hydrochloric acid (conc.). As soon as dissolved as shown by the disappearance of all copper, filter on previously washed and ignited asbestos. Wash thoroughly the beaker in which the solution was made with 20 c.c. of dilute hydrochloric acid (1.1), pour this on the filter and wash the carbon out of the beaker by means of a wash bottle containing dilute hydrochloric acid (1.1) and then wash with warm water until all the acid is washed out of the filter. Dry the carbon at a temperature of between 95° and 100° C.

Before using the apparatus a blank shall be run, and if the bulb does not gain in weight more than 0.5 milligram, put the dried filter into the ignition tube and heat the pre-heating furnace and the part of the combustion furnace containing the copper oxide. After this is heated start the aspiration of oxygen or air at the rate of three bubbles per second, as shown in the potash bulb. Continue slowly heating the combustion tube by turning on two burners at a time, and continue the combustion for 30 minutes if air is used; 20 minutes if oxygen is used. (The Shimer crucible is to be heated with a blast lamp for the same length of time.).

When the ignition is finished turn off the gas supply gradually so as to allow the combustion tube to cool off slowly and then shut off the oxygen supply and aspirate with air for ten minutes. Detach the potash bulb and prolong, close the ends with rubber caps and allow it to stand for five minutes; then weigh. The increase in weight multiplied by 0.27273 equals the percentage of carbon.

The potassium copper chloride shall be made by dissolving 1 pound of the salt in 1 liter of water and filtering through an asbestos filter.

Option No. 1.—While a pre-heater is greatly to be desired, as only a small percentage of laboratories at present use them, it was decided not to make the use of one essential to this method; subtraction of the weight of the blank to a great extent eliminating any error which might arise from not using a pre-heater.

Option No. 2.—The Shimer and similar crucibles are largely used as combustion furnaces and for this reason it was decided to make optional the use of either the tube furnace or one of the standard crucibles. In case the crucible is used it shall be followed by a copper tube, 3-16-inch inside diameter and 10 inches long, with its ends cooled by water jackets. In the center of the tube shall be placed a disk of platinum gauze, and for 3 or 4 inches in the side toward the crucible shall be silver foil and for the same distance on the other side shall be copper oxide. The ends shall be plugged with glass wool and the tube heated with a fishtail burner before the aspiration of air is started.

Graphite.

Dissolve 1 gram sample in 35 c.c. nitric acid (1.13 sp. gr.) filter on asbestos, wash with hot water, then with potassium hydrate (1.1 sp. gr.) and finally with hot water. The graphite is then ignited as specified in the determination of total carbon.

H. E. DILLER, Secretary.

The Odor of Metals*

Water chemically pure is a colorless, tasteless, ordorless fluid; but in combination with other forms of matter it acquires each and all of these characteristics. Similarly it has been asserted by scientific authorities that metals free from alloys are odorless. In combination with other metals they frequently develop a strongly marked and sometimes a disagreeable smell, as in the case of copper alloys. Still the major premise was declared to hold until recently, when, according to report, as the result of exhaustive experiment, it has been established that all metals have their distinctive odors, which under set circumstances can be very perceptibly demonstrated. The proponent of the new theory is Herr Karl Gruhn, a Berlin metallurgical chemist and mineralogist, who has devoted much time and attention to the elucidation of his subject, and claims to have fully ascertained the origin and characteristics of the metallic odors. As a primary result of his experiments he asserts that even in its normal state each of the metals has its distinctive emanation, which is, however, so faintly perceptible as to have induced the assertion respecting its non-existence. This effluxion increases with the increase of temperature to a remarkable degree, and the rule applies equally to the royal as to the industrial metals. It is, however, most noticeable in connection with the latter, tin, copper, zinc, lead, and iron furnishing similar evidences of its application; and the odor is not at all affected by the oxidizing of the metal. Herr Gruhn found that each and all of the metals named gives out its odor in fullest strength after about an hour's treatment, but it then decreases, even when the temperature is still sustained, till the smell becomes as faint as before the temperature was raised. Then when the heat is withdrawn and the metal is allowed to cool, all trace of the odor disappears, as if it had been utterly driven off. An immediate return to high temperature redevelops the smell in only a faintly perceptible degree, but if a few hours are allowed to elapse before the metal is again heated it repeats in full strength all the phenomena attending the first test. It appears to have recovered from the exhaustion of its emanation and to have recharged itself with the agents producing the odor. From these facts and the other data collected, Herr Gruhn arrives at a conclusion which challenges another commonly accepted belief. He disputes the theory that smells in their infinite variety are all produced by the effect upon the olfactory nerves of volatilized atoms from the effluxing substance which mix with the atmosphere, and so excite the sense. He says this is most decidedly not so in the case of metallic odors, which he affirms to be a property stored up by the substance and retained in a state almost quiescent till under the heat stimulus it is given off as the radio-active properties of other minerals, and that as in the case of radium the emanations are unaccompanied by chemical change or loss of weight. The difference is that in the case of the odor there is an exhaust which is repaired by reabsorbtion, which in its turn is unaccompanied by chemical change or increase of weight. This relation to the radio-active properties of the uranian group and other allied minerals is indeed the asserted fact upon which Herr Gruhn lays chiefest stress, for he claims to have separated and isolated a metallic odor, and to have found that in its manifestations it establishes a strong affinity to the radio-active emanations of the rarer minerals.

*The Australian Standard.

Mining News from the Many Camps

ARIZONA

(Special Correspondence.)

Bisbee.—It is estimated that the Copper Queen and Calumet and Arizona smelters will require 3,000 tons more ore daily than is now being treated, after the new furnaces now being installed are blown in. By November 1st, at least a third more men will be required in the Warren district.

T. Farukawa, M. Otagawa and T. Hasegawa, of Tokio, Japan, arrived at Bisbee recently to study American copper mining methods for the purpose of improving mine practice in Japan. Mr. Farukawa, who is the owner of the Ashio copper mines, one of the largest and most valuable properties in Japan, and which has long been the property of his family, is a student in the Columbia School of Mines.

Yuma.—O. L. Goer has sold to eastern capitalists who recently made a purchase from him the remainder of his claims in Squaw gulch three miles from the Arizona & California railroad. He sold forty claims, divided into two groups. The Indian Queen group is in the Harqua Hala mountains, Maricopa county. The Golden Rule group is in the Harcuvars in Yuma county. The property has a ledge of white quartz running $4 gold to the ton.

Three miles from the A. & C. railroad and twelve miles from Bouse the Woods Investment people expect to put in a reduction plant not later than November.

Prescott.—The Octave Mining Company now has more than 100 men at work in the Octave mine near Congress Junction. It is expected that the mine will be unwatered within thirty days. The forty-stamp mill is running one shift. The mine is opened to a depth of 1,950 feet, and the underground workings measure many miles.

W. J. Gilbert of Gilbert exhibited some specimens here recently taken from a rich strike of ore made on a claim being opened by J. V. Roby & San, located near headwaters of Castle creek. The specimens fairly glisten all over with free gold and assay many thousands of dollars to the ton. The streak is small, but alongside of it is a paystreak of gold ore, rich enough to pay a handsome profit, even after the high transportation expense of getting it to smelters is taken into consideration.

"One of the best surface showings for a copper mine that I have recently seen is on a claim owned by Andrew Laswell, in the Placerita district," said Hon. A. J. Doran, who returned from a mine inspection trip through that section. "Cropping out on the surface can be seen a large amount of what is ruby copper," he said. "In addition there is a large tonnage of carbonates exposed and taking the entire prospect into consideration, it is, in my mind, a very promising mine."

Tucson.—Fred H. Kline, the Nevada mining king, is to invade the Arizona mining field, and, judging from the number of mining locations he has filed, he intends to start operations in the Vulture district on a large scale.

Recently Mr. Kline filed with the recorder of Maricopa county eighty locations. The ground he has thus taken up for mining purposes lies close to the famous old Pump mine in the Vulture country.

It is known that Mr. Kline has been looking over the Vulture district lately and he was evidently greatly pleased with what he saw there. Whether he intends to erect a smelter there is not known, but it is thought that he will do so in the near future.

This will have a most stimulating effect upon the mining industry all over the territory. Mr. Kline's long experience and great success in the industry makes this move on his part a most important and far-reaching one for Arizona. A few men like Mr. Kline can start a boom anywhere.

Some high grade silver ore is being shipped to San Francisco from the old mines of Governor Pesqueira. The ores pay over $400 per ton in silver and lead.

Within thirty miles of Tucson $1,000,000 is being expended in a smelter, yet this fact is not generally realized, although it is known in a general way that a smelter is being put up at Sasco. Councilman Mose Drachman has just returned from a trip to Sasco and he states that the work under way there is surprising and much greater than he had been lead to believe.

"A big force of men and teams are at work on the smelter, and much of the machinery has already been put on the grounds. The smelter will have a capacity of 150 tons at the beginning and the company on this plant and a few other improvements will expend fully a million dollars. The smelter will be constructed so that additions can be made to it as rapidly as possible."

Sasco is located just across the boundary in Pinal county and is eight miles from Red Rock on the line of the Arizona Southern road which runs from Red Rock to Silver Bell.

Sasco was named for the Southern Arizona Smelting Company, which is putting up the plant. The people who are interested in this company are also interested in the Silver Bell mines.

Kingman.—A new ore shoot was recently discovered in the Vanderbilt mine Cerbat, some of the ore from which assayed $900 a ton. The Golden Gem mill continued to treat thirty tons of ore daily. The entire district from Cerbat to Mineral Park is active. The Blackford mine is shipping. The new hoisting works of the Blackford has been completed and the shaft will be continued down to 1,000 feet.

Arrangements are being perfected for resumption of work on the McKesson mines, south of Kingman, by Dr. Crane. A hoister is on the way from Denver and as soon as possible it will be put in place and the work of sinking below the present level will be continued. The mine shows big values in gold at the lowest level, but it was found rather expensive handling water with a windlass and a pump will be put in. A new Fairbanks-Morse gasoline hoist has been taken to the property and will be installed at the Louise mine. The Louise shaft is one of the best propositions owned by the company. Here they have discovered high grade copper ore which carries gold and silver values. The latest sample taken from the bottom of the shaft assaying $642.75 to the ton.

Globe.—It is reported that the Old Dominion Copper Mining and Smelting Company of New Jersey declared a quarterly dividend of $1.25 on July 1st, also on July 2d, the United States Globe mine declared a $4 dividend, which permitted the Old Dominion Company of Maine, the holding company, to declare a quarterly dividend of $1.

Clifton.—The New York-Arizona Gold and Copper Company are doing active work on their property and business is brisk. Six wagon loads of lumber have been taken out for building purposes and for use in the mines.

Florence.—The Calumet Copper Mining Company and the Big Lead Mining Company have been consolidated under the name of "Kelvin-Calumet Copper Mining Company." Plans have already been perfected for an increase in the capacity of the Big Lead mill from 50 to 150 tons per mill day of twenty-four hours. This, with the

other 50-ton mill of the company, now in operation, will give the new company a total mill capacity of 300 tons per mill day. Work on the addition of the Big Lead mill will be commenced within thirty days from this date and it will be rushed to completion as fast as possible.

The Ray Copper Company's mill at Kelvin, which has been undergoing a transformation in the shape of remodeling and the installation of new and modern machinery, is nearing completion and will soon be turning out concentrates at a rate that will, with the product of the Kelvin Calumet mills and the ores and general freight of the camp tax the P. & E. rolling stock to its limit.

Tombstone.—A big mining deal which is of much importance to the Tombstone district and particularly to Gleeson and the Dragoon range of mountains, was consummated recently when the C. & A. Co. of Bisbee secured a bond on the property of the Leadville Mining Company in the Turquoise mining district.

The bonding figure of the property is not officially stated, but it is understood to be $300,000.

The Leadville company is capitalized at $600,0000, and the transfer is made on a basis of 50 cents per share The Leadville group is regarded as a valuable one, and has been favorably reported upon by some of the most eminent mining engineers of the West. The Ores of the group are sulphide, carrying a heavy percentage of sulphur and iron and making an ideal self-fluxing ore for smelting.

Phoenix.—Emil Holden, one of the many mining men who now make Phoenix their headquarters is about to close a deal at Wickenburg for the sale of the Devine group in the Sunset district, near Wickenburg, to Nevada capitalists.

J. M. Day and J. F. Wall, representing Senator Jones of Nevada, and others, were recently at the Devine property to make an examination and will return within the next few weeks to investigate farther.

Wall and Day gathered several specimens from the ledges on the Devine property and had assays made. The results showed from $60 to $75 free gold to the ton and between fifteen and twenty-five per cent. copper. The claims have been worked for the last twelve years by the Devine brothers.

Recently Mr. Holden brought in several samples of rich ore from the Tombstone and Black Diamond mining properties in which several prominent Phoenix people are interested with him. Some of the samples assayed as high as $400 to the ton in free gold, silver and copper glance.

Holden is a mining engineer of ability, and in that capacity is connected with the Black Diamond and Greenstone companies. In fact, it was he who interested the Nevada capital in the Wickenburg section. He will, in all probability close several other deals of importance in that vicinity. He is enthusiastic over the country and is imparting that enthusiasm where it does the most good as the results of his efforts have already shown.

If one at all familiar with Arizona will scan her listed resources for a moment, stop and think of their possible development, he must admit that the future wealth of the territory, or state, is almost inconceivable.

L. E. Hewins and R. H. Palmer, recently filed on six or seven mineral claims not far from the property of the Pike's Peak Mining Company, thirty-five miles northwest of Phoenix. Just what their value is can now only be spoken of in conjecture, but there is running across them a two-foot ledge of material said to be mainly silicate of magnesia, which is the book name for what is commonly known as meerschaum, from which pipes and high-priced fancy articles are made, a material that is supplied to the markets of the world mainly from Europe, the older deposits of which are fast becoming exhausted.

Mr. Hewins has a number of specimens in his office, some of them of considerable size, and a lot of still finer specimens he has prepared for shipment east for a careful examination by competent authorities. The stone, or clay, or whatsoever it may be called, is marvelously light, lighter even than the pine wood of similar dimensions, and in fact as light as meerschaum. Some of it is very clear and chalky and easily whittled, and again some of it carries occasional chrystallized spots that would make it less valuable. But there is a large quantity of it in good-sized proportions that will surely prove a fine commercial article if it shall be determined that it is really meerschaum.

(Staff Correspondence.)

Cochise County Warren Mining District.

The Sunset group of fifteen claims is owned and operated by W. J. Cleavland, Frank Samoniel and J. H. Campbell. They have near 400 feet of development on the group. In a sixty foot shaft they have a fine body of ore running 51½ per cent lead, 18 ounces silver, five per cent copper and $4.00 in gold. The group is located three miles west of Bisbee on the Tombstone road. This part of the district is a sulphide proposition carrying copper and gold.

The Empire State mine, five miles from Bisbee is being rapidly developed by the Empire State Mining Company. They have over 1,000 feet of development, and have encountered a large body of low grade ore. They are driving in on the main vein from the first crosscut and 350 feet from Portal in good ore. Alex. Erickson is general manager. Headquarters of the company are in Utica, New York.

Cochise County Black Diamond Mining District.

The Santa Ana Arizona Mining Co. are developing a group of fourteen claims on which they have shafts and tunnels of about 450 feet. This property is located about sixteen miles northeast of Tombstone and 200 tons of ore shipped from this property run from eight to nine per cent copper, thirty ounces silver and three ounces gold. Their last shipment after packing it down the mountains on burros, netted them over $5 per day's work to the man. New machinery is now being installed to sink the 250 foot shaft to 400 before any drifting will be done.

Tombstone Mining District.

Eugene Roberts is working a group of four claims 3½ miles south of Tombstone. He has three shafts down seventy-two, eighty and fifty feet, also a crosscut tunnel on which work is now being done. The ore runs four per cent lead and twelve ounces silver per ton. They will cut the main body of ore at a depth of eighty-five feet from tunnel portal.

The Tombstone Consolidated Mines Co. have just installed a new Prescott Duplex pump, 15x23x39x13x24 on the 1,000 foot level, with a capacity of 2,500,000 gallons in twenty-four hours. They are working 350 men. The mine supplies part of Tombstone with water for fire and domestic purposes.

Santa Croz County.

The Arizona Gold Mines and Milling Co., located 3½ miles from Patigonia, and about sixteen miles north of the Mowry, is in a flourishing condition. J. J. Wyatt formerly of Denver, is general manager. In a talk with the manager it was learned that his company has a group of nine claims in the Patigonia district and a group of seven in the Tombstone district. On the Patigonia property they have a five stamp mill, with facilities to increase to ten more. Arrangements have just been made to install five additional stamps. A force of fourteen men are regularly employed, and a forty horse power engine drives the pumps and other machinery. So far 1,200 feet of

development has been done. They have four shafts running from sixty to 200 feet in depth, which are all crosscut and connected. The ore assays $10 to $12 gold, silver seventeen to eighteen ounces. At the Tombstone property the superintendent, J. J. Wyatt, is giving it his personal attention. This property is located in what is known as the South Pass of the Dragoons, or the Old Swazee or Rider property. Over 800 feet of development has been done. Horse whim has been installed to take out the surface water and assist in further development. The vein averages four feet in width with assays running $25 per ton. In the vein they run across small kidneys of very high grade ore, giving as high as $50 to $200,000 in gold to the ton. The largest of these kidneys Manager Wyatt said weighed twenty pounds. The company is clear of all debt and well financied and capitalized at $100,000, par value stock, $1.00 per share.

Cochise County Warren Mining District.

The Modern Mining Company is straightening up their 200 foot shaft. This property adjoins the Bisbee-Arizona. They have a good strong shipping vein adjoining. Above is the Box Canon Mining Company, who own a group of ten claims. They have a shaft down in ore and also a tunnel in ninety feet from Portal in copper ore. They have four men at work on development, and expect to ship ore in sixty days.

Lee Stevens and O. W. Zane, own a group of twenty-two claims adjoining the Modern on the west and the Bisbee on the south. Work will be prosecuted as fast as circumstances will permit. The ore that has been encountered is copper and silver, running as high as six per cent copper and all ledge matter.

The Bisbee Extension Co. has a group of claims nine miles from Bisbee. They have done over 200 feet of development in the last two months and will sink to the 500 foot level before drifting. They are well equipped for the work and will put on machinery for extensive operations. The Bisbee and Arizona adjoins the above. The company is sinking and working from twenty to twenty-five men.

Cochise County Rincon Mining District.

C. L. Jones, Jos. Muheim and J. W. Mitchell have located a group of twenty-four claims in Rincon Mining district, Zozo canon, about forty miles northwest of Benson, near the Apache Mining Co. This is comparatively a new district, except the Apache, which has about 600 feet of development work done, showing copper in all the openings. This group of claims is being operated by some of Bisbee's most prominent capitalists and mining men, and they are very much surprised as their development and work progresses, as high grade copper ore has been encountered in all their openings. They have four men at work all the time, one shaft is down sixty feet and a fifteen foot drift was run, when a large body of ore running ten per cent copper and six ounces in silver was struck. Quite a number of Bisbee's energetic mining men and merchants are putting their money and faith in this camp and think it will be second to none in Arizona.

Rich Strike of Copper in Paradise.

The Bisbee-Sonora Development Company bids fair to be a big producer of valuable ore as well as dollars and cents. Their properties consisting of thirty claims in the Chiricahua mountains in what is known as Paradise district about fifty miles northeast of Douglas. The company has at this place a ledge sixty-three feet wide and it has been traced for over half a mile and most of it contains valuable mineral matter. The company is driving two tunnels to cut the ledge one above the other and six shifts of men—three on each tunnel are working day and night. The ore taken out shows gold, silver and copper. The copper as they go down turns into a strong sulphide with large, healthy showings of bornite. Assays at the present stage show about seven per cent copper, thirty-two ounces of silver and three dollars gold. The experts who have made a careful study of this property speak in the highest terms of it and the development work more than verifies their opinion. Assays have been made from large quantities of ore and the deeper they go the better it runs, some specimens of copper running as high as thirty per cent. Ore of high grade has just been struck in the upper tunnel according to reliable reports just received by your correspondent. This tunnel will cut the big ledge at about 160 feet and great things are expected and considerable excitement prevails. The company was offered $100,000 in gold for these claims before work to any extent had been done but the offer was refused.

The company has other properties of reported good values but the writer has no knowledge of them at present.

B. J. Ames, the president of the Bisbee-Sonora Development Company is a thoroughbred Yankee from the Nutmeg state and keen as a cactus thorn. H. C. Beumler, a prominent lawyer here, holds the next place while S. S. Badger is secretary and treasurer. All these gentlemen are reliable. Their office is in this city.

Their development work is being carefully watched and the recent striking of rich ore in the tunnel mentioned is attracting much attention and will undoubtedly prove a boom for Paradise.

THE BLACK HILLS

The mines and mills of the great Homestake are again in working order, and a few months hence scarcely a trace of the vast damage done to the mine by the fire and water will be visible. It is an evidence of the great wealth of the company and the recuperative power of American enterprise. Fire and water are very useful elements when under control, but when they get the advantage and run wild they mock the feeble efforts of man. The damage done by the fire in the Homestake mine, and by the water it required to extinguish it, will foot up approximately $1,000,000. The daily capacity of all the stamps—1,000, when in full operation, varies from 4,000 to 4,500 tons.

All the larger mines in the Hills are now running up to capacity, or getting in shape to do so in the least possible time. The Homestake company is now working 850 men, and with the remaining 200 stamps put in commission, the force will be increased to 1,000. Last week there were 800 stamps dropping.

The Golden Prospect hoist started up early in the month, and the Star mill began dropping its stamps about the same time. Before the month expires the Homestake and about all the other large mines around Deadwood and Lead, and, in fact, throughout the Black Hills districts, will be in full swing with increased force, and tonnage.

Reports from Hill City state that Mr. Hazlett, who has an option on the Niagara, has taken a bond on the Northern Light in the Tigerville district.

The Golden West mine, west of Rochford, has been seriously damaged by the recent flood washing away their dam and the destruction of their water power. But with true mining grit the management say they will soon have all that fixed better than before, and will also enlarge their plant.

R. G. Gillespie went over to look at the Niagara mine on the 24th and returned Tuesday afternoon. In reply to the question, "How do you like it?" his reply was that he couldn't tell much about it, as they were not deep enough. They are now down about

forty feet, and will crosscut the vein at the 500-foot level, to ascertain its width between walls. It is known to be over nine feet wide and prospects fairly well in the pan.

The boiler for the pump which will be installed at the Catawasa was hauled out to the mine last week, and the engine will follow as soon as it arrives. The water has been very troublesome owing to the heavy rains, and it has been impossible to make much progress in the shaft, which has now attained a depth of about fifty feet. The vein holds about four feet wide at the bottom, and maintains its grade in free gold and telluride, which shows a heavy concentrate in the pan.

We are pleased to chronicle another rich strike in gold discovered by George and William Schenk and Judge A. T. Feay. The mines, which are called the Goldfield group, are located at the Ernest Bellemore ranch, and consist of five claims called the Goldfield and the Wandering Boys mines. We have seen some of the samples which consist of quartz with a heavy crust of what has the appearance of vandium, through which is sprinkled an abundance of coarse free gold. This strike was made about a week ago and the boys are opening it up. Dell Dickson is also interested in the new find.

The work of unwatering the Holy Terror shaft is now in operation. The skips have been completed and were brought to Keystone by Charles Hall.

All the boilers at the mill have been repaired and fire was in four of them last week.

Considering the immense amount of repairing which had to be done before work could commence, the work has progressed with amazing rapidity.

The Clara Belle Mining Company at Oreville is still pushing work on its incline shaft, sunk to locate the course of the old vein, and now 250 feet deep. Five hundred feet of drifting have been done without encountering the vein. Recently the course of drifting has been changed and for the last 150 feet the drift has been in quartz, with indications that the main vein would soon be reached.

The work of soaking the big tanks in the Branch Mint mill preparatory to starting up, is now about completed, and the rest of the finishing touches will be given within the next three or four weeks. There are a number of details yet to be attended to so that it will be something less than sixty days before the stamps are dropping. With the 18,000 tons of ore now in the bins, in the chutes and blocked out and ready for breaking, the operations will be continuous when they are once commenced.

The people of Galena are anxiously awaiting the returns of James D. Hardin, the president and general manager of the company from New York, knowing that his arrival means the starting of industry and prosperity in that camp.

George M Bennett of the Hy-ma-lu-lu company, operating about three miles from Mystic, was in the city and reports everything in good condition (except the roads) in and about the camp of Mystic. The Hy-ma-lu-lu company has suspended work for a short time on their new tunnel, pending the arrival of some necessary machinery. This tunnel which is now in about one hundred feet, was run to cut two veins of ore, one nine and the other five feet in width that were encountered in the shaft near the apex of the hill. The ore is cyaniding ore and will run from five to twenty dollars a ton. It was found necessary to install air drills as the formation was growing very hard. Mr. Bennett will order a complete equipment including an air compressor and drills and as soon as it is installed work will be resumed in the tunnel.

Superintendent John Gray was in from the Wasp No. 2 mine on Yellow creek yesterday and reports that property running at its full capacity. He says they have not yet been able to demonstrate that a man can do as much work in eight as in ten hours but at that, they are getting along all right. The Wasp is one of the low grade propositions and it requires the nicest economy to insure a profit. Mr. Gray says that as long as they can keep their head assays over $2 per ton, they can run along with a fair margin of profit.

In the Custer county camps there are no important changes to record in the mining department over a week or ten days ago.

The Catawa shaft is being sunk as fast as ten men can put it down but we learn from the projectors McGonigal and Hazlett that they are badly handicapped just now, by an undue amount of water which is flowing in nearly as fast as they can take it out.

The New York and White Spar mica mines are both producing and adding to their force from day to day. The installation of machinery for the new electric plant is progressing satisfactorily under the supervision of the expert mechanic, Mr. Sweeney. But heavy bodies move slow and it will be some weeks before the whistle will blow at the mill.

There is not much change in the mining department since last week, but all of the available labor finds ready employment in the different mines around Custer at good wages.

The Ivanhoe, Clara Belle, and Ideal are driving ahead with a good force. The Saginaw is pushing the work in the mine, and the mill building is going up as fast as twenty men can build it.

The Niagara mine which is another enterprise being pushed by these same gentlemen is making good headway. This is said to be a free milling proposition and the mine is situated over the line in Pennington county. Ten men are also employed on this property. There is consderable work going on in the district in the way of development on gold and silver locations, and mines of wolfram, mica and ambligonite are being opened up.

It is reported that McGeorge Bros., working a group of claims near the head of Bear Gulch in the western Black Hills, have discovered what promises to be an iron mine. The iron is of such quality and has been discovered to be in place and in such quantities, that the Colorado Fuel and Iron Company has interested itself to the extent of sending three experts to make an examination. These gentlemen were recently in the Black Hills and made an examination of this iron rock in the Bear Gulch district, and it is said it is of an extra high grade quality. Further examinations of the property are to be made by the same people.

The latest in the way of a new strike of importance was made during the fore part of the week by Mr. James Demereau, who notwithstanding the many disappointments which it has been his lot to bear his courage has never weakened and his iron will knows no such word as fail. This latest strike is an eight-foot vein of white and bluish granulated quartzite full of fine streaks of telluride and running high in gold. This location is called the Gold Ochre mine and as the vein is solid, vertical and continuous it bids fair to develop into a bonanza. Thus far we do not hear of anything doing in placer this spring, and the excitement in black sand has subsided for the time being.

With the resumption of work in the Bald Mountain Wasp No 2, Maitland and all other mining districts in the Northern Hills, will come active development work again on many of the properties in Deadwood gulch. The work contemplated at the time of the recent consolidation of the Hidden Fortune and Columbus will no doubt be commenced in the near future. The Hidden Treasure and the

Pennsylvania companies are both planning to start extensive development work on their properties, and are now only waiting for arrangements to be completed by the directors and managers. Both properties are equipped with buildings and machinery, and have the best of prospects for being added to the producers with the proper amount of development. The Big Four and the Gladiator also both hold valuable ground in this well known phonolite belt, and should be added to the working list. Work already accomplished by the various companies in the Deadwood gulch district have proven that there are large bodies of medium high grade ore distributed throughout the belt.

The Homestake Extension and the Montezuma and the Whizzers are both properties that may start operations any day. The Montezuma and the Whizzers was a producer for years and will again be worked as in the past.

The discovery of heavy beds of asphaltum, in the Shoshoni, Wyoming oil fields, at the eastern base of Copper mountain, is attracting more attention than the oil deposits. A Shoshoni dispatch says many large samples of an excellent grade of this material have been brought into town within the last few days from these oil fields. The beds will be exploited, material tested, and if found satisfactory works will be established and the article mined, refined and put on the market.

COLORADO

BOULDER COUNTY.

Good reports come down from Ward, the oldest district in Boulder county.

At one time Ward was the greatest gold producing camp in the county. Recent news from there state that the old camp is looking up, and the Miner says the Modock company has a shaft down 450 feet, with drifts aggregating nearly one mile, and ore bodies blocked out estimated at 120,000 tons, of which at least ten per cent. is smelting ore that will approximate $100 per ton.

The average value of the milling material is about $10. The vein is one largest in the country, being from twenty to sixty feet in width.

To work this large exposure of mineral to better results than were formerly obtained, the Modoc mill is to be entirely remodeled and adapted to the latest improved process of cyaniding, a change of treatment that seems to be taking a strong hold upon mine operators in many parts of the state where suitable ores are found. The manager has taken up a water power on the upper South Fork of St. Vrain, where he will install a power plant to generate 2,000 horse power electric to run both mine and mill, the surplus energy to be furnished to enterprises in the adjacent districts.

The Columbia Extension, or No. 5 mine, has just installed a powerful new hoist, unwatered the workings to the 120-foot level, upon which the miners are drifting in a fine body of ore, and shipping two cars per month carrying $50 to $60 per ton in gold.

Sargent and associates, leasing on the 200-foot level, east from the old Columbia shaft, have a three-foot vein which averages $52 per ton gold in car lots. They have shipped an average of two cars monthly for the past five months. They have also finished a crosscut to a parallel vein on which they are now drifting in apparently high grade ore.

Manager Mitchell of the Ward Struggler has, since last spring, been drifting in a vein of ore from four to four and a half feet wide, averaging over $70 per ton. The material is a heavy auriferous sulphide.

Orm and Fairhurst are leasing on the Dew Drop vein of the Big Five tunnel. They have just opened into an ore body over twelve inches wide, averaging $100 in gold. They have in addition a large body of good mill ore.

Turning to other sections, we find that the big Langridge mill on South Boulder is yielding very satisfactory results on numerous tests, showing an extraction of over ninety per cent. of the values in the big quartz dike. Again the stimulus given the mining industry in Jamestown district by the recent strikes in the Havana and in the American, together with the success of the Wano mill, is seen in the resumption of work on many of the long idle properties.

The Camera group in the Ward district, which is being worked under bond and lease by Adams, Blair and Lesser is showing up splendidly in crosscut is now being driven from the 150-foot level in the Camera to the Klondike vein, which is considered the main vein of the group, and which shows a large body of good ore on the surface. Abe Adams, who has done extensive and intelligent prospecting on the group, considers it one of the most promising properties in the Ward district, but has always contended that the shaft was not sunk on the main vein for which they are now crosscutting. So soon as this is reached drifting will be commenced, and an upraise made to the surface. Considerable good ore has been produced from the old workings by the owner, Major Jain, and by lessees under him. The men who now have hold of it are old miners, and will push work with skill and intelligence.

F. Van Keuren and B. F. Hooks are taking out some high grade tungsten ore from the Kaffir lode, one mile southeast of Sunshine, near the Jones ranch. The Kaffir is an old property which has produced considerable high grade gold ores in past years. The vein is from seven to eight feet wide, through which runs several seams of tungsten ore. Tests of the mill ore show twenty-three and one-half per cent., and the high grade between fifty and sixty per cent. tungsten.

B. G. Austin of Denver, who has a lease and bond on the John Jay at Camp Providence visited the property during the past week to view the conditions and figure on what is necessary to be done to put the property on a productive basis. The John Jay has large bodies of good mill ore blocked out, with seams of high grade smelting ore running through the masses, but the property has been idle for a long time and requires a new boiler and pumping plant to unwater and clean out the mine. With a milling plant on the ground to treat the John Jay ores the mine would surely pay handsomely. For the amount of ground broken it has probably produced as much good ore as any mine in the county.

A branch office of the S. H. Morse Machinery Company of Denver, has been established in Boulder with S. J. Scott in charge. This house is furnishing a large amount of machinery and equipment for the East-Colorado PPower Company, and they are also doing a good business with the mining interests in the hills. Attention is directed to their ad on another page. Mr. Scott was formerly employed with the Knox Machinery Company, and is well and favorably known throughout the county and should control a good business for his house.

Norm Walker has five men sinking the shaft and driving the adit to intersect the shaft on the Gold Finch, in which he made the strike of fine smelting ore recently. The work being prosecuted is confined to the opening up of the large bodies of smelting ore of which a carload, good for three ounces gold to the ton is ready for shipment. More men will be added as room is opened for them to work, and when stoping begins. The vein is large and clearly defined, being crosscutted but in one place in the tunnel to width of eight feet, but the level is carried only the usual four

and a half feet in width. Norm has a good enough thing to assure him a comfortable berth on easy street.

Superintendent Frank Thatcher has recently put a force of men to work in the Denver Tunnel, and will push work to get into network of veins between the tunnel portal and the Snowy range. The breast of the tunnel is about 1,200 feet from the portal, and several veins have been cut in its course, but the purpose of the company is to cut the entire system of fourteen known and patented veins and such other as are blind on the surface. Much ore has been shipped from these claims that carried values of $28 to $40 per ton, but the principal work in the past has been and for some time to come will be in development through the Denver tunnel, preparing the property for heavy production. It is equipped with a fine power plant and drills.

The Lost Lake, of which Wilson Davis is superintendent recently shipped several tons of very high grade ore to the smelters. The Lost Lake property, consisting of twelve patented claims is situated on the east end of Guinn Mountain, three miles west of Eldora and a short distance west of the famous Revenge mine. The veins are large and well defined, and are opened on the surface of several shafts. The principal work of development has been done in and through the two tunnels, which are respectively 430 and 920 feet long. Besides a production of considerable high grade tellurium ore the veins, carry large quantities of good milling ore amenable to cyanide treatment, with good safe margins of profit. It is a matter of regret that so promising a property should be unworked for a long time as this has been and we are glad to know that work is to be prosecuted with diligence. Mr. Davis knows how to do it.

Many of the leasers on the Trevarton ranch, owned by the Wolf-Tongue Company, made last week their initial shipment for this month, which only represented from a week to ten days work, and the following is a record of some of the shippers:

Dan Harrigan shipped 1,100 pounds of crude ore which netted him $168.24 after paying all charges and royalty.

For a few day's work C. E. Saunders received a check for something over $100.

Reinhart and Loach sent 800 pounds of crude ore to the mill which brought over $100.

Miller Brothers shipped 3,500 pounds of crude to the Wolf-Tongue which run 39.07 per cent and netted them $400.

C. O. Nelson and associates shipped 900 pounds of crude ore which run 48.17 per cent. or about $525 per ton.

Ruch and Dalton shipped 490 pounds of crude, running 52.30 per cent., 480 pounds running 37.80 per cent. and 2,400 pounds 15.57 of a valuation per ton, respectively, of about $575, $400 and $165.

E. C. Scruggs shipped from his lease on the Trevarton ranch, six and a half tons which run over $400 per ton.

From Beaver Creek, Ogilvie and Wilson, shipped thirty tons of crude, which milled 4,800 pounds of concentrates, running 63.45 per cent., and worth at present about $700 per ton.

General manager C. P. Oliver, of the Colorado Tungsten Company, has contracted for the erecetion of a new plant on shaft No. 4, which will be a duplicate of the fine plant on the tunnel shaft, consisting of boiler, compressor and hoist. Later on the present plant of No. 4 will be placed on another of the company's shafts. The machinery to be on the ground within thirty days. So soon as the instaullations are made contracts will be let for sinking an additional one hundred feet on the No. 4 shaft and on the tunnel shaft. The former is now down to 300-foot level. In quantity and quality the ore holds good in the deepest workings of the properties of the Colorado Tungsten Company.

In the yards of the Colorado & Southern at Boulder, is tbout twenty-five carloads of machinery, awaiting transfer to the various freight cars of the Colorado & Northwestern, to be taken up to the scene of operations of the Eastern Colorado Power Company, which is constructing its great power plant on Middle Boulder.

Many carloads of machinery have already gone up to Sulphide, in fact the entire equipment of the Colorado & Northwestern, including that employed in the daily train service is taxed to the utmost to take care of the regular business of the road and that of this new company.

The freight now accumulating in the yards includes boilers, hoists, steam shovels, diamond drills, pumps, engines, dump cars, rails, cement, derrick timbers and great quantities of other material and machinery employed in construction work of this kind.

At Orodel, at the junction of Four Mile creek with Middle Boulder, quite extensive yards are being built to facilitate the transfer of freight from cars to the freighters who will transport the machinery and material from here to the site of the power plant, about a mile and a half up Middle Boulder.

The force of men employed on this great enterprise is constantly being increased, and before the month is gone will include at least 500 men.

So great is the demand for tungsten ore for both domestic consumption and export, as a result of the expansion of the manufacture of tungsten steel, that miners are reaping a harvest of no mean volume. Prices for tungsten ore containing 60% WO_3 (tungstic acid) have advanced from $1.25 per unit ($75 per ton) in 1904 to $8 per unit ($480 per ton) in December, 1906, and in the current year there has been a rise to $11 per unit $660 per ton). Even higher prices are talked of, and according to the information received by a staff correspondent, who reviews the tungsten industry of Boulder county, Colorado, $15 per unit ($900 per ton) may be expected. At present the Boulder county mines contribute fully 80% of the production of the United States. Advances have been made in purifying the marketed product, with the result that better prices are being obtained generally.

CRIPPLE CREEK.

The Cripple Creek camps appear to be steadily improving in all departments. The older mines are holding their own or better and new shippers are coming to the front every week. Under new management the deep drainage tunnel is being pushed as rapidly as possible. The formation is very hard, but the management hopes to have 1,000 feet done this year.

Leasers are working many of the older mines and some of them are opening new ground to good advantage. They are generally making money. As a rule they are short of first-class miners in nearly all the Cripple Creek districts. Take the state together and there is a field for at least 2,000 more number one miners.

The Isabella mine on the northeast slope of Bull hill reports a remarkable strike. The shoot is said to be fifteen feet wide at a depth of 900 feet, the result of opening new grounds. The same ore shoot is now found at a depth of 1,000 feet. The territory above 900 feet has never been prospected, and it is believed that the shoot will run to the surface. The ore will run from twenty ounces to 400 ounces, which is $8,000 to the ton or $4 to the pound.

On the 900-foot level the ore is free and rusty gold, while on the 1,000, it is sylvanite and calaverite, some of

it being four inches thick. So far as known, no other ore shoot ever found in this camp compares with it. The mine some eight or nine years ago shipped the richest carload of ore ever mined in the district, giving returns of $227,000. It is believed that a carload of the ore now found will run as high or even better than the rich carload of years ago.

The strike has been kept secret until it could be proven up, and now that this has been done the fabulous strike news is becoming the talk of the district among mining men.

An important decision was recently made by the management of the Ajax Gold Mining Company, owning a large and rich acreage on the south slope of Battle mountain adjoining the Portland and other heavy producers on this noted mountain. The Ajax management has decided to put the entire property under the leasing system, which has proven so successful with the Stratton's Independence, Anchoria-Leland and other well known properties in the camp.

General Manager Homer Prentice will begin leasing the property in blocks, and all work on company account ceases today. The royalties will range from fifteen per cent. up, according to the grade of ore found, mined and shipped.

The Ajax mine has been one of the best in the Cripple Creek district, and during the early days there was mined hundreds of thousands of dollars. Recently only a fair tonnage has been made by the few lessees and company account, but as there is a vast unexploited territory, it is expected with a score or more of lessees working, that the new ore shoots will be opened up and that the tonnage will rank with the other big properties of the camp.

The Jo Dandy cyanide mill, located on the Jo Dandy property of Raven hill, has started to treat the ore mined from this well known property. The management has been running ore through the rolls and crushers and today started to put it in the tanks for the cyanidation. This mill was erected a few years ago near Gillett, and was one of the best obtainable. The mill never ran more than a few months, and J. M. Wright purchased it, had it dismantled and re-erected on his property. It has a capacity of 200 tons daily, but it will be some time before tne plant will be running under full head. The Jo Dandy mine has hundreds of tons of ore broken down and awaiting to be hoisted and treated.

The Trilby Mines Company, operating on the Trilby and Ben Harrison lode claims on Bull hill, is shipping out, with the assistance of some half-dozen sets of lessees, fifteen cars of ore a week of an average value of $35 in gold to the ton. The company is making money as well as all of the lessees, even though each lessee is paying an exorbitant royalty of fifty per cent. flat and furnishing everything.

Operations are being conducted on every level. It is reported, but unconfirmed, that the company, while following along on its regular ore shoot on the lower level, came into a small streak that carries values running as high as $3 in gold to the pound or $6,000 per ton. This ore, it is stated, is being saved separately and will be shipped in sacks, if it continues to hold out for any distance.

The Beacon Hill Development Company, a Colorado Springs leasing corporation operating on the Mabel M. property of the Gold Dollar Consolidated, on the east slope of Beacon hill, is making regular shipments of ore that give returns of from $30 to $35 in gold to the ton. The screenings will run better than two ounces. The ore is being broken down about five feet wide between the sixth and eighth levels, the latter being the lowest in the mine. It is expected when winter sets in and the ground freezes that an attempt will be made to sink and get below the present water level.

The Union Leasing Company, operating on the extreme northern block of the Mabel M., is getting out some very nice ore from its lease. At a depth of 300 feet and a short distance from the shaft this company some time ago opened up about eighteen inches of ore that ought to give returns of from $50 to $60 in gold to the ton. Considerable development work is curtailing shipments, however.

OURAY COUNTY.

A rich strike is reported in the Cache mine near Ouray, 1,200 feet southwest of the noted Mineral Farm mine, the same contact or blanket vein being encountered in a short run east to intersect it from a point a little above the bed of Canon creek. The contact carries the same character of ore as that on the Mineral Farm—silver, lead and copper, with baryta spar mixed though it. The values run over 300 ounces in silver, over thirty per cent. lead, and between fifteen and twenty per cent. copper. Fred Herzinger has over 1,200 feet of the contact within the boundary lines of one of his claims.

As in the case of the Mineral Farm, the ore lies on the blue lime formation and beneath a layer of conglomerate sandstone.

The people of Ouray are now beginning to realize that another Leadville in mineral resources will be Ouray's portion when the blue lime formation beneath the district is properly explored.

According to the Plaindealer mining operations are booming up about Ironton and Red mountain. In less than thirty days that section will be under full headway.

At the Joker tunnel, an example of thorough and practical mining which cannot be equaled in but few places in the country, there are twenty-eight men now working. At present there are but three Leyner drilling machines in operation but within a very short time several more will be started. John Mattison, until recenty with the Camp Bird company, is in charge of the work.

The Genesee is also getting under way for an active season's work, and though a little late in opening will make up for lost time. John Davie is in charge of the work. A crew of twenty men are at work, but this force, as in the other instance, will be increased as soon as possible. There is always a certain amount of preliminary work that must be done about a property which has been shut down for a few months and which necessarily consumes considerable time. In as many instances as possible the former crews were obtained by the company.

Arps Brothers took up a new jigging machine, Wednesday, to the Mickey Breen mine, the same being installed with other new and modern machinery by the Tempest-Apex Company, which is getting busy up there again and proposes to do a lot of systematic mining. The jig for separation of ores is a new departure in that district and its work will be watched with interest. It took six big horses to haul it.

The National Belle was opened up the latter part of this week with a small force of men at work and will be producing ore in a very short time. The National Belle at one time was a very rich mine and still contains a large amount of ore which has never been touched.

The Gold Lion tunnel, in which a large number of the Red Mountain Railroad, Mining and Smelting Company stockholders are interested and yet which cannot be called a property of that company, has settled its strike troubles and has again opened up for work with a full force of men.

Work at the Treasury tunnel, it is said, will be commenced by the latter part of the month and the great

task of driving the big bore toward the Camp Bird territory continued.

At the Barstow there are but a few men employed as yet. The pumps have been started and it is hoped that but a short time will elapse before a large crew is again at work. A considerable amount of assessment work is being done on the claims in that territory and Red mountain and especially Ironton are beginning to feel the good effects of the reopening of the mines and the employment of men.

There are about twenty men employed in repairing the railroad track between the Joker and the Genessee and placing the roadbed in safe condition. There is also a large number of men between Red Mountain and Silverton.

The Bismuth, a property owned by eastern parties, is being operated by H. Y. Russell, who is the superintendent of the Gold Lion property at Red Mountain. The Bismuth is especially noted for its rich bismuth ore, several tons of which are already mined and on the dump at the property. The prospect of its joining the list of shippers during the present season is promising.

Sullivan and Galligher are working their property in the same district. For the present year they have been taking out ore and shipping sufficient to pay the operating expenses. There are five claims in the group, all of which show pay ore almost from the surface. On the John L. is a tunnel from which the shipments are being made, and it is evident that this group is destined to become one of the big mines of the camp, as it is one of the few properties that will pay expenses from the start.

Another important move in mining circles is that of S. F. Hopkins and MacDonald in taking hold of the old Miller properties at the head of Bear Creek. These parties are backed by Sam MacDonald and other owners of the Strong and Gold King mines of Cripple Creek. The showing is very encouraging as they have a good streak of bismuth and gray copper ore. While the prospects have always been promising on this property sufficient development has never been done to determine the extent and value of the ore bodies. Under the present management it is thought that the property will make a shipper.

SUMMIT COUNTY.

(Correspondence.)

The Reliance dredge, operating in French gulch, has discovered a vein of valuable zinc ore. As near as can be told the vein is about 15 feet wide and all ore. This vein is supposed to be the extension of the old Oro now being worked by the Wellington Development Company. It is the second vein the dredge has cut that shows considerable zinc values. The ground will most likely make one of the best mining propositions in the county, as present indications show.

The Sallie Barber have their shaft cleaned out, retimbered and are now working on ore. It is the intention of the management to commence shipping in the near future; Mr. Putner is in charge.

The Little Sallie, owned and operated by A. W. Phillips is taking out some very good ore as sinking operations are being pushed ahead.

The Colorado Dredging Company, operating on the Swan river, are pushing things as fast as conditions will allow, the scarcity of labor at present being a serious hindrance. It is the intention of the company to build two dredges as soon as possible, the timber already being on the ground. Mr. Tuttle is general manager.

CHAS. H. JOHNSON.

The Bulletin says the Old Union mining property, including the mill and all other property owned by the company, was sold last Monday at sheriff's sale to satisfy judgements for labor, supplies, etc., held by various persons in and around Breckenridge. The property was bid in by William E. Caldwell of Milwaukee, Wisconsin, a stockholder in the Old Union Company, for $31,451.75. Mr. Caldwell, George C. Smith and others of the company now propose to reorganize and commence development operations. Others of the Old Union who were in Breckenridge this week are: Charles S. Webb of Oshkosh, Wisconsin, secretary of the company, and W. H. Fowler, of Los Angeles, a stockholder. The company held a stockholders' meeting in Denver last Monday.

Breckenridge.—C. B. Mahaffey, an electrical engineer of Colorado Springs, was in the city since our last soliciting contracts for electrical power for the Leadville Light and Power Company. He says that next April the company he represents will install in the Blue river valley one of the highest voltage transmission cables in the world. This cable, mounted on steel towers, will be taken through Breckenridge on its journey down the Blue. It is of enormous weight, and will be transported with great difficulty. The Leadville Light and Power Company is only one of a syndicate of eight companies which proposes to furnish power for all the industries of northern and northwestern Colorado so cheaply that no private corporation can compete with them. We did not learn as to the success of Mr. Mahaffey in making contracts here.

MEXICO

Reports from Chihuahua are to the effect that the stockholders of the El Rayo Mines Company, operating near Santa Barbara in Chihuahua, will soon be asked to vote on the proposition to increase the capital stock 100,000 shares, par value of $5 each. The object of this increase being the acquisition of the properties of the Buena Vista Consolidated Mining Company, adjoining the El Rayo properties. Negotiations for the purchase of these properties have been going on for some time past, but definite arrangements have not been made until recently. The terms of this purchase are that the El Rayo company shall pay 60,00 shares of its capital stock, or $6 per share in cash. Therefore, out of the new capital which it is proposed to raise, 60,000 shares are to be paid out for the property, while 20,000 shares additional are to be disposed of for working capital and general corporate purposes, the remainder being held in the treasury to be sold as future requirements may dictate at prices not less than par. It is also proposed to incorporate a new company under the laws of Maine to acquire the title of the properties mentioned and also the titles of the property of the El Rayo Mining and Development Company, South America, and the Descubridora Mining and Development Company, South America, the plan being to dissolve these last named corporations in order that the new company may take over the titles and operate all of the property in which the El Rayo Mines Company is interested.

Torreon.—In a conversation with the president and manager of the Bancaria Chino y Mexico, Dr. J. Lim, of Torreon, it was stated that the proper authorities have been applied to for the concession to operate a steamship line between all the ports on the western coast of Mexico to connect with those of China, and there is every reason to believe that the concession will be granted, as it would probably be one of the largest items that has ever been undertaken by any corporation of Torreon.

Mr. Lim also told the representative of The Herald that he had more to give out in regard to this matter, but could not do so until he heard from the authorities concerning the concession. His company is now erecting

a bank building, which will be one of the most modern three-story buildings in the republic.

Kon You is still in Torreon, but will leave shortly for Mexico City, where he will remain but a short time. Dr. Lim said that the prince would not be the guest of any one in particular in Mexico City, but would have apartments at one of the hotels.

The Canana Herald states that the famous Santa Eulalia, fifteen miles from the city of Chihuahua, is estimated to have produced since its discovery by the Spaniards in 1703 the enormous sum of $900,000,000—more than any other of the famous districts of Mexico.

That the great Santa Eulalia mining zone has not been more than scratched is shown by the fact that one mine alone, the Potosi, contains ore bodies of an estimated value of $300,000,000.

Speaking of the Postosi mine, Proffessor Robert T. Hill, in his report made in January, 1904, says: "The Potosi, purchased recently for $200,000 gold, contains now in sight, in caves below the 1,000-foot level, high grade ores which it is estimated will take fifty years to ship at the present shipping rate of 500 tons per day. One ore body alone has been proved to be 300x 600 feet in size and it is proved to be 300 feet deep. By estimates this ground contains ore to the fabulous value of $270,000,000, Mexican money, or $135,000,000, gold."

Since Proffessor Hill's report the Potosi has become a heavy shipper of carbonate or zinc ore, found in bodies distinct from the silver-lead ore.

The company is now down about 1,700 feet on the mine and it is understood that 800 or 900 feet farther has been proven by diamond drills, showing big ore bodies. According to Proffessor Hill and other reports that have leaked out in spite of the extreme secrecy maintained by the company, of the ore of the Potosi mine at $300,000,000, Mexican coney. This makes it one of the greatest, if not the greatest, mine in the world in point of estimated ore values.

The Verde Grande Mining Company, which lost its furnaces by fire about the first of June, has ordered two new Medbury Rotary furnaces, which will be shipped and installed as quickly possible. The properties of this company are about forty miles northwest of Hermosillo. The furnace destroyed had been in operation but a few months, but had proved within that time that it was what the ores out there need for successful reduction. So two new ones of the same patents and make were ordered to replace it.

The new mill at the Constitution camp in the Tortuga region, about twenty-five miles eastward from Hermosillo, has been completed and commenced operations this week. George Lewis, the representative of the contractors for the erection of the mill, Messrs.Greenleaf & Co. ,of Los Angeles, California, will take a ten day run of the new plant before turning it over to the company. The Constitution and Italia mines, upon which this mill has been erected, are some of the properties in Sonora owned and operated by the U. S. A. Mines Syndicate.

Advices received in Torreon from Zaculpan, D. F. say that the Crecia mine near that place is now making regular shipments of ore to the San Luis smelter that are runing as high as $5,000 per ton above all expenses. For the past year and a half there has been a great deal of development work going on at this property and it is now reckoned among the best paying in the country.

Word has been received that Harry L. Shrom, aged thirty-five, of Greneville, Pennsylvania, was instantly killed a few days ago by falling a distance of 10 feet in the Palmilla mine of Pedro Alvarado, at Parral. He was a graduate of the Cleveland Polytechnique Institute and a member of the Elk's lodge at Concord, North Carolina.

The Hinds Consolidated Mining Company, which recently took over the Clarina and Refugios in the Santa Barbara section of the Parral district, has been granted a concession for the building of two reduction plants and a railroad two kilometers long from the Mexican Central near Santa Barbara to the property of the company.

In a recent report to his people in England concerning the work at the San Carlos property, E. H. Gregory, manager of the San Carlos and Mezquital mines at Mezquital del Oro, Zacateas, said: "The operations in progress at the mines are being conducted with a view to developing sufficient reserves of paying ore to enable the mill to be restarted. Good progress is being made with this work and the manager has already been able to report satisfactory results, over 20,000 tons of ore available for milling having already been blocked out.

The installation of the Trenton system aerial tramway at the San Toy mine in the Santa Eulalia district has been completed and has been in successful operation for several days. Manager J. P. Hutchinson, states that the tramway is at present being utilized to convey crushed rock for the roadbed of the standard guage railroad which the company is building from the lower end of the tramway to the main line of the Mexican Central, a distance of about four miles. The tramway, which has concrete piers and steel stations, is about four and one-half miles in length and was installed at a cost of more than $80,000 gold.

The interests owning the San Luis Potosi custom smelter have entered the Jelisco fields and will buy ores in competition with the American Smelting & Refining Company and the Compania Metalurgica de Torreon. As the result of a deal made with Makeever Brothers, the American operators who are heavily interested in the San Pablo mines in the Etzatlan district and the El Frovo mine in the Hostotipaquillo district, an ore-buying company has been formed and all ores destined for the San Luis Potosi smelter that are transported over the Ameca and San Maros line of the Mexican Central will be controlled by this Makeever concern. The headquarters of the new company are in Etzatlan, and the manager, W. A. Pratt, is a well-known assayer of that place. It is known as the Jalisco Minerals Company.

WYOMING

From Soshoni come reports that the old channel of the Wind river for fully twenty-five miles are now staked and being worked by placer miners.

As yet little more than prospecting has been done, although several rockers and sluice boxes are being operated, the owners of which are making good wages. The gold-bearing gravel runs well over $1.00 per cubic yard and as a good worker can handle nearly or quite ten yards per day, it can be seen that the returns will be a corresponding number of dollars per day.

From all indications the values at bedrock will be phenomenal, but all attempts to reach bedrock have had to be abandoned for the time being on account of the unprecendented high water in the river.

J. L. Bieler, vice president of the American Foundries Company, has become interested in the Wind river placers and has returned East for the purpose of obtaining a dredge with which to economically work the sands of this stream.

As a medium-sized dredge can handle 500 cubic yards of gravel per day, and as the operating expenses on a machine of this class will be less than 15 cents per cubic yard, the profits of working $1.00 per yard gravel should be several hundred dollars per day for a single dredge.

Other local dredging companies are being organized, and before the summer is over several dredges will be in operation.

Recent advices received from Lusk, Wyoming, state that within the last

two weeks the conditions at the mine of the Copper Belt Mining Company ground have improved to such an extent that there is no longer any doubt as to the substantial and permanent nature of the ledge. A number of inquiries regarding this ground have been made in Deadwood during the past week owing to the fact that property in the same locality is being held by Black Hills people who have been anxiously awaiting the result of development in the Copper Belt workings.

The main shaft is now down 460 feet, having been sunk sixty-five feet during the month of June. The vein continues to widen with depth and is now eighteen feet from wall to wall and is growing better in quality with every foot gained. It was carbonate at the surface and varied in value from six per cent .to sixty per cent. copper to the ton. Within the past fifty feet copper sulphides have commenced to appear and the percentage of these has rapidly increased in the last fifty feet. For this reason it is thought that the shaft is nearing the permanent water level and that by the time the 500-foot level is reached the carbonate character of the ore will have entirely disappeared and that the vein will have become a solid body of pyrites. In addition to this it has lately been found that the vein matter contains native copper in sufficient quantity to show up plainly in the pan.

The president and general manager of the company, Edwin Hall has recently entertained at the mine a number of the eastern directors who have expressed the utmost satisfaction with the manner in which the affairs have been conducted and were unanimous in the opinion that they are interested in a property that is destined to become a great producer of copper. They have also given their approval to the plans of the management which contemplate increasing the development work in the near future. There are now three-eight hour shifts working in the shaft, in fact all the employes are on eight-hour time except the engineers who still continue to work under the old rule of twelve hours. With this force the shaft will be sunk to a depth of 500 feet at which point drifts and stopes will be commenced and the taking out of ore will begin.

It has also been decided to commence development work on the Omaha claim where a splendid surface showing has been found. On this ground at the grass roots the carbonate ledge was uncovered and the ore at that point has assayed as high as $200 in copper to the ton. A shaft will be put down at this location and will be connected up with the main working shaft, thus affording ample ventilation for the mine. The new shaft will also be used for hoisting ore when the proper level is reached, giving the company a doubly larger shipping capacity when the work is completed. They are now in condition to take out a car load of good grade shipping ore every day and by the time that the Northwestern road gets a branch from the main line, a distance of about twelve miles to the mine, they will have no trouble in furnishing two car loads per day for the smelter.

The officers of the company are: Edwin Hall, president, Lusk, Wyoming; E. S. Averill, vice president, Chicago; Arthur A. Taylor secretary and treasurer, Chicago; H. C Snyder, assistant treasurer, Lusk, Wyoming; Edwin Hall, consulting engineer; Prof. George E. Condra, consulting mining geologist. The board of directors are: B. L. Paine, Lincoln, Nebraska; E. S. Averill, Chicago; Edwin Hall, Lusk, Wyoming; Peter Nichol, Lincoln, Nebraska; Arthur Taylor, Chicago.

Reports from Shoshoni represent that the Captain Jack tunnel on Copper mountain has just cut a large body of ore carrying native copper and $10 in gold to the ton.

Work has been going on steadily on these claims for the past six months and the striking of the ore is a triumph for the judgment of the man in charge.

Michigan is paying for the work on these claims and the backing is reported to come from the Calumet and Hecla.

From the present indications this camp is destined to become an important factor in the supplying of the world's growing demand for copper. Nearly every day sees some new discovery of a large body of high grade ore either in this district or in the adjacent Willow Creek district in the former Shoshone Indian reservation.

Four horse loads of mining supplies, including steel rails, and ore car and boxes containing several hundred sticks of dyanamite, while being taken up the mountain to the Bradley mine, toppled over within a few yards of the camps, where a score of men were at dinner. The dynamite was badly crushed, but did not explode. Had it exploded the lives of all the men in the vicinity would have been taken and practically the entire town of Centennial would have been blown off the face of the earth. Their escape is considered little short of miraculous.

This summer will see the construction of an another piece of railroad in the Black Hills that will be of considerable value to the whole section. Articles of incorporation have just been filed with the secretary of state at Pierre for the Wyoming Western Railroad Company, capitalized at $4,000,000. This is to be an extension of the Missouri river and Northwestern line. The new road will run from the western terminus of the Crouch line, at Mystic, 200 miles through Pennington county in this state and Weston, Crook and Buffalo counties, Wyoming, ending at Buffalo, Wyoming. It will penetrate some of the rich timber and cattle lands and thus give the Milwaukee line, which is building into Rapid from the eastern part of the state, an early market for this section of the country. The incorporators are Charles C. Crouch, Verne E. Crouch, Jacob S . Grantz, Charles E. Fulton, Elmore L. Hurlburt, all of Rapid City.

The Yukon Territory

George R. Williams recently returned from the Klondyke, says the wages paid skilled mechanics for ten hours' work in the Yukon territory will average $10, or $1 an hour. Common laborers, including board, $4 to $5; without board, $6 to $7. Two-horse draft teams and drives $25. Clerks per month, $150 to $300.

Everything consumed in the way of living costs from two to three times as much in this country as it does in the United States. There is no article sold for less than 25 cents, no matter how trivial, as there is no money in circulation of a lesser denomination than that amount. The cost of living will remain high as long as the means of getting supplies into the country remain as they are, and what is true of the Yukon Territory is true of the Yukon valley from the Alaskan line to the coast. The only relief for these conditions is a trunk line of railraod from the open sea into the heart of this great valley, to be in some way under the control of government authority, in order to keep down excessive freight and passenger rates.

It is estimated that the copper output at Mount Molloy, Queensland, during 1907 will be 2,000 tons of blister copper. This is assuming that necessary additions are made to the reduction plant.

The minister of finance stated recently in the Chilean Senate that deposits of nitrate had been found at Antofagasta and Tocopilla, as rich as those of Tarapaca when first discovered.

PERSONALS

W. J. Cox, general manager of the famous Camp Bird mine near Ouray, has been spending several days in Denver. He was the guest of Thomas F. Walsh at Wolhurst last week.

T. B. Burnite, of the engineering and sales department of The John A. Traylor Machinery Company of Denver, has been appointed superintendent of that company. Burnite is a very competent machinery man.

R. J. Lucas of St. Louis, who owns the Mineral Farm mine at Ouray, will spend the heat of the season there with his family. These montain resorts are blessings to the overheated easterners who are able to take advantage of them.

George Crawford of New York, who is at the head of three or four heavy mining syndicates operating in the Red Mountain district, Ouray county, is now on the ground and pushing operations with all possible dispatch. It is understood the enterprises are now in shape for steady work, and before the season closes Mr. Crawford hopes to have several hundred men employed there. The combination is the nucelus of a great mining enterprise.

W. H. Steadman of Chicago is looking over mining properties in the Breckenridge district, Colorado.

Adolph Hersch, secretary and treasurer of the Diamond Drill & Carbon Co., New York, sailed recently for Brazil, via Europe.

A. H. Seip, vice president of the Mine and Smelter Supply Company, has gone East with his family to spend the summer. They will return in October.

G. D. Doveton, M. E. of the firm of Doveton & Purington, Denver, has gone to Mexico City, where he will have headquarters for some time. Purington is in Siberia and will remain until December or January.

C. M. Schofield, superintendent of the Newberry group of mines near Kingman, Arizona, has returned to the property from a visit to Boston, Massachusetts.

B. A. Bosqui has returned to San Francisco from Kalgoorlie, Western Australia, where he has been engaged as metallurgist for the Great Boulder Perseverance Company.

Willard F. Snyder has returned to the west from his New York visit, accompanied by several of the eastern directors of the Amalgamated Nevada Mines and Power Company, who will inspect the company's holdings in Nevada.

Horace V. Winchell of St. Paul, Minnesota, chief geologist for the Great Northern Railway Company, recently visited the Boundary district of British Columbia.

A. D. Hatfield has resigned as secretary and treasurer of the Wellman-Seaver-Morgan Company, Cleveland, Ohio. He is succeeded by W. H. Cowell, heretofore connected with the Algoma Steel Company, Sault Ste. Marie, Ontario.

William Edenborn, a director of the United States Steel Corporation, has been elected president of the Sheffield Steel and Iron Company, to succeed Leonard Peckitt. The operating headquarters of this company have been removed to Sheffield, Alabama.

Walter J. Browning, general manager of the Mazapil Copper Company, at Concepsion, del Oro, Zacatecas, Mexico, states that there is no truth in the reports that have been circulated of his appointment as manager of the Rio Tinto mines in Spain.

R. W. Brock, of the geological survey of Canada, has been employed by the Ontario bureau of mines to make an examination of the Larder lake region. Later in the summer he will join W. H. Boyd in the Lardeau district of British Columbia.

C. S. Webb of Oskosh, Wisconsin, has just returned from Breckenridge, Summit county, where he is heavily interested in the Old Union mine, mill and other property in French gulch. He reports the Old Union Mining and Milling Company sold out. The Old Union property was sold last week Monday, on execution to satisfy judgment debts, to William E. Caldwell of Milwaukee, in the interest of a syndicate who will now put the property on its feet and make it a profitable producer. In the hands of competent men the Old Union should be a profitable mine. It is in good territory, has undergone considerable development and is well equipped.

OBITUARY

We are sorry to hear of the death of Harry Mock, an old time San Juan miner and business man. Harry was ambitious to win a competence in mining, but like millions, the goal of his ambition was just beyond his reach. He struggled hard, fought a good fight, made some money and died trying to make more. He leaves a widow, three or four children and many friends.

One of the saddest misfortunes that ever happened in Denver was the death of Arthur Clark, of the Clark Drug Company in the Albany hotel. He was killed in an automobile accident last Sunday. No man in the state was more popular than Arthur Clark. He was highly esteemed by all who knew him, and his circle of acquaintances was as wide as this country. He was a warm-hearted, whole-souled, companionable, manly man, the very soul of honor and good nature. Thousands mourn his untimely taking off. Verily in the midst of life we are in death.

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Hendrie & Bolthoff Mfg. & Supply Co.	3
Engineers, Metallurgists, Chemists, Assayers, etc.	4
Joan A. Traylor Mchy. Co.	4
G. T. & F. D. Granger	4
Denver & Rio Grande Railway	27
Colorado Southern Railway	28
Colorado Midland Railway	29
Interstate Clearing House	30
Riedel Investment Co.	30
Colorado & Northwestern Ry.	31
E. W. Vanduzen Co.	33
C. A. Finding	33
Joseph Bordeleau	33
Boston-Mexican Mines Co.	34
The Great Western Machinery Co.	34
S. H. Supply Co.	34
Fred T. Smith	34
Works	35
The Western Chemical Co.	35
Cary & Fielding	35
The Schaefer Tent & Awning Co.	35
American Forge Works	35
Fairbanks-Morse & Co.	36
Colorado Iron Works	36

It is possible to judge by the eye the quality of coke. The characteristics of a coke with a high content of ash are: (1) Impurities consisting of incombustible substances in the fracture; (2) dark, sandy appearance, without a great abundance of pores; (3) exceptionally high weight; (4) the edges of the pores appear with metallic luster in the fracture. The following are characteristics for a high content of volatile ingredients: (1) The coke falls without sound when dropped upon a hard substance; (2) it has a black appearance without luster; (3) it contains small blue-black spots in the fracture, due to uncoked coal; (4) it appears in thick pieces which break apart easily; (5) the interior of the pores is deep black and the edges have a tarry luster.

The output of coke and anthracite pig iron in the United States in March was 2,225,175 tons, making a total of 6,475,850 tons for the first quarter, of which 72,012 tons were spiegeleisen and ferro-manganese produced by the steel companies.

THE STOCK AND METAL MARKETS

Colorado Springs

July 24.—Elkton opened this week at 55, El Paso declining to 40, Gold Sovereign sold well at 4, while Portland was slightly higher at 112 bid, no sale. Tuesday Isabella jumped to 22½, due to strike report. Portland closed higher without sale at 1.14 bid, 1.20 asked. El Paso advanced fractionally to 40⅛. Wednesday trading opened up fairly active. Isabella advanced to 24, Mary McKinney was strong at 56. Following are the quotations:

Mines.

	Bid
Acacia	08½
Black Belle	03
C. C. Con	04¾
C. K. & N.	07
Dante	05½
Doctor-Jack Pot	06½
Elkton	53¾
El Paso	40½
Fanny Rawlins	03
Findley	53
Gold Dollar	06
Gold Sovereign	04
Isabella	24
Jack Pot	04½
Last Dollar	02
Lexington	02¾
Mary McKinney	56
Mollie Gibson	04
Moon Anchor	02¼
Old Gold	03¼
Pharmacist	03½
Portland	114
Vindicator	75
Work	16¼

Unlisted.

	Bid.
Jennie Sample	5¾
Jerry Johnson	06
U. Gold Mines	07½

Prospects.

	Bid.
Alamo	01
American	009
Aola	008
Banner	01¼
Buckhorn	0065
C. C. & M.	009
Des Moines	01
Gold Bond	01½
Gould	01½
Grace	002
Ida May	02½
Keystone	0095
Little Puck	01¼
Mary Nevin	2⅛
Missouri	005
New Haven	01
Pilgrim	005
Pointer	005
Rattler	004
Raven	01
Republic	008
Rose Maud	01½
Rose Nicol	01
St. Thomas	01½

Miscellaneous.

	Bid.
Blanche	003
Cable	005
Colo. Gold Camp	004
Easter Bell	0025
Favorite	002
Flower of the W	007
Gold Hill	002
Hummer	005
Key West	001
Kitty	002
Mariposa	004
Marquette	002
M. J. T.	002
Montreal	01
Nellie V	003
O. K.	005
Tenderfoot	003
Texas Girl	003
Uncle Sam	0035
Volcano	002
Wide Awake	002

New York

July 24.—From very good sources comes word that several of the largest consumers will enter the market and purchase copper for future delivery at 22 cents a pound. This may influence other buyers to enter the market. It is admitted that supplies are down to bed-rock and that consumers must enter the market soon, unless production is cut down in the different plants. A representative of a large electric company said: "When copper prices are advancing the disposition of consumers is to cover their future requirements at as low a level as possible. Copper jumped to 25 cents a pound for electrolytic, and as a result the big consuming companies contracted for large supplies, which will not be exhausted until the latter part of this month or the first of next month. When these supplies are exhausted the only alternative is to go in and stock up again. We do not care to buy on a falling market, and this is the reason why there is no buying to speak of upon the present basis."

H. H. Rogers is said to have stated that no further reduction would be made in the price of copper in the current quarter. The consensus of the big producers is that there will be a decided change in the copper market in the next few weeks.

Notwithstanding the decline in the price of copper the Tennessee Copper Co. has increased its dividend rate from $1.25 per share, or 5%, to $2 per share or 8%. The company paid 5% in 1904, the same in 1905, and 10% in 1906 on its $5,000,000 stock outstanding. Par value of the stock is $25. Officers of the company state that the dividend could have been increased but that it was advisable to put the money back into the property.

The earnings of the Amalgamated Copper Co.'s capital stock for the first six months were over 8%. The company has just declared a dividend of 2% for the quarter. This action on the part of the company in declaring a flat 2% dividend instead of 1½% and ½% extra as was the case in the preceeding quarter was not generally expected. It would seem from this that H. H. Rogers and the directors have confidence in the future of the copper market. The earnings of the company are running far in excess of the amount required to pay an 8% dividend, but is it not likely that a raise will be made. Amalagmated Copper in the first half of the current year received something like 23½ cents for copper. Its net profits for that period aggregated something like $14,000,000, and it paid out in dividends 4%, or approximately $6,160,000. Its surplus over dividends, therefore, was more than $8,000,000.

The Amalgamated Copper Co., since its organization has declared $53,126,000 in dividends on its authorized capital stock, which is at the rate of a little over 5½% a year.

The following table shows the mount paid in dividends since the organization of the Amalgamated Copper Co.:

Year	Capital	% Dividend	Disbursed
So far this year	$155,000,000	6	$ 9,300,000
1906	155,000,000	7	10,850,000
1905	155,000,000	4½	6,975,000
1904	155,000,000	2	3,100,000
1903	155,000,000	2	3,100,000
1902	155,000,000	2½	3,875,000
1901	155,000,000	*7½	8,425,000
1900	75,000,000	8	6,000,000
1899	75,000,000	†2	1,500,000
Total			$53,125,000

*Paid dividends on $155,000,000 part of year only.
†Began dividends later part of 1899.

Following are the quotations:

	Close.
American Copper	93¾
American Smelting	118⅜
American Smelting, pfd	106
Anacond Copper	58⅛
Colo. F. & I.	31½
National Lead	61½

	Close.
Adams Con.	09
Alice.	3.85
Breece.	20
Brunswick Con.	35
Comstock Tunnel	27
C. C. & Va.	64
Horn Silver	1.45
Iron Silver	2.00
Leadville Con.	09
Litle Chief.	06
Ontario.	3.75
Ophir.	2.10
Potosi.	14
Savage.	64
Sierra Nevada	41
Small Hopes	25
Standard.	1.50

Denver

July 24.—The following were the quotations and sales on the Denver Mining Stock Echange yesterday:

Stocks.	Bid.
Acacia	08½
Dante	05⅜
C. C. Con.	04¾
Isabella	24
Work	16¼
United Gold Mines	07½

Boston

July 24.—The American Smelting and Refining Company now has the firm of J. P. Morgan & Co. interested in its affairs. The Morgan firm became interested in American Smelting last March, when 100,000 shares were purchased at $100 per share, or about fifteen points under the market. The stock was contributed by two of the Guggenheim brothers, who found themselves in a panicky market with to large a load to carry comfortably.

While the deposits of the American Smelting and Refining Company show but ten per cent earned on the stock it is "semi-officially" stated that the company is actually earning at the rate of about twenty per cent on its stock, but depreciation charges are very heavy. This year the company will have to meet a depreciation charge of $1,600,000 expended on the erection of the San Bruno plant on San Francisco Bay, which has been abandoned, about seventy-five per cent. of which will be a complete loss.

The question at present in the minds of many shareholders is whether the copper stocks can pay dividends on a falling market. At the present time there is nothing in the market pointing to a reduction as low as eighteen cents.

At any prices for copper from fourteen to eighteen cents, Calumet and Hecla first, and Calumet and Arizona second, would earn the greatest profits per share. At any price from fifteen to eighteen cents Shannon shows the lowest actual return per share.

In the appended table are shown the present rate of dividends and the net earnings per share for fifteen stocks, with the red metal selling from fourteen to eighteen cents per pound.

	Div.	18c	17c.	16c.	15c.	14c.
Calumet & Hecla	$80	$98.55	$88.42	$78.32	$68.21	$58.10
Calumet & Arizona	20	23.42	21.05	19.67	17.80	15.92
Wolverine	20	18.56	16.94	15.33	13.71	12.10
Granby	12	14.23	12.77	11.31	9.85	8.39
Osceola	14	15.46	13.53	11.60	9.67	7.74
Amalgamated	8	12.37	10.92	9.46	8.01	6.55
Utah Consolidated	6	8.03	7.41	6.79	6.17	5.56
North Butte	8	8.68	7.81	6.98	6.16	5.34
Quincy	18	12.09	10.36	8.64	6.91	5.13
Copper Range	8	7.60	6.75	5.91	5.07	4.23
Mohawk	10	6.99	6,05	5.12	4.18	3.25
Anaconda	7	6.33	5.54	4.75	3.95	3.17
Butte Coalition	2	2.00	1.75	1.50	1.25	1.00
Shannon	2	2.00	1.59	1.20	.80	.40
Tamarack	8	9.33	7.00	4.66	2.33	.00

Following are the quotations:

	Close.
Adventure	2½
Allouez	45
Amalgamated	93½
Atlantic	12¼
Bingham	15
Calumet & Hecla	800
Centennial	29½
Copper Range	89⅛
Daly West	15¼
Franklin	14¼
Granby	125
Isle Royale	19¼
Massachusetts Mining	5½
Michigan	14½
Mohawk	82½
Montana C. & C.	28
Old Dominion	44
Osceola	129½
Parrot	19
Quincy	118
Shannon	17¼
Tamarack	105
Trinity	23¾
United Copper	62¼
U. S. Mining	48
U. S. Oil	10¾
Utah	46½
Victoria	7
Winona	7½
Wolverine	162
North Butte	83
Butte Coalition	25¼
Nevada	14⅛
California & Arizona	167
Arizona Coml.	248

Nevada

San Francisco, July 24.—The following were the quotations on the mining stock exchange today:

Stocks.	Close.
Utah.	.28¼
Cumberland-Ely	.08⅞
Giroux	.07⅝
Tonopah of Nevada	12.00
Montona Tonopah	3.30
Tonopah Extension	1.50
Ohio Tonopah	.03
Mohawk	17.00
Jumbo	4.25
Jumbo Extension	1.85
Vernal	.16
Goldfield Mining Co.	1.65
Florence	5.50
Grett Bend Extension	.14
Esmeralda	.10
Goldfield Cons.	8.75
Bullfrog Mining	.16
Mustang	.23
Standard	...
Pittsburg Silver Peak	1.37½

Metals

July 24.

Bar silver	.68⅞
Copper (N. Y)	$21.00@22.00
Lead (St. Louis)	$5.00@5.05
Spelter (St. Louis)	5.85

COPPER OUTPUT OF CANADA.

Consul A. E. Smith of Victoria furnishes statistics showing that the production of copper in British Columbia has increased 800 per cent during the past ten years, while the remainder of Canada has increased but fifty per cent. The whole of Canada produced 13,300,802 pounds in 1897, British Columbia's share being 5,325,180, while of the estimated 55,000,000 pounds total production in 1906 British Columbia's output was 43,000,000 pounds. A Canadian editor states that the dividends declared last year by British Columbia mining companies amounted to between $3,000,000 and $4,000,000.

MACHINERY AND EQUIPMENT

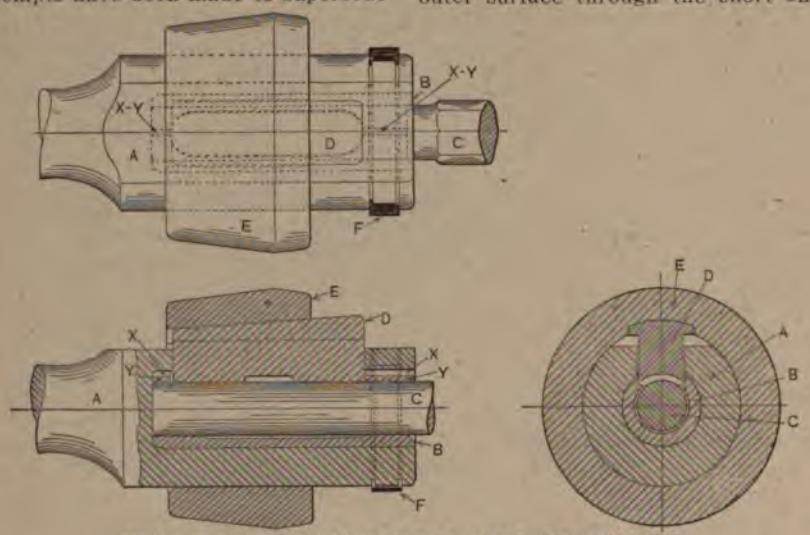
Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.

BULL-DOG GRIP, SELF TIGHTENING, ROCK DRILL CHUCK.

The long-tried and fathful device made up of "U" bolt and chuck key has, up to the present time, out lasted all other devices for holding the drill steel in the chuck; although numerous attempts have been made to supersede it with a design to save time and the "cuss" words of the "driller" when he bruises his fingers, and also to reduce the cost of repairs.

As will be seen in the cut on this page, this device consists of: Piston and Chuck "A," Chuck Bushing "B," Chuck Key "D," Keying Ring "E," Spring-clip Stop "F."

The key-ring is a steel drop forging, hardened on its lower face and in the tapering slot which fits the tapering face of chuck key.



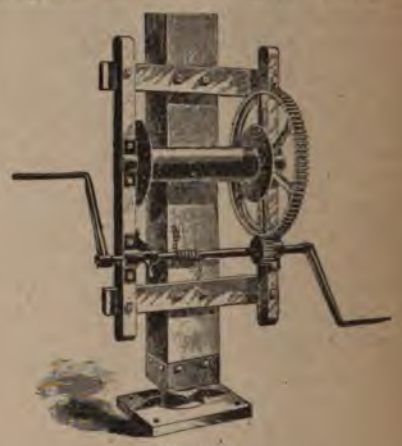
Bull-Dog Grip, Self-Tightening Rock Drill Chuck.

The chuck bushing is hardened on its inner face and slightly chambered opposite where the inner face of chuck key bears on the shank of drill steel, providing an elastic grip when the device is keyed up. To facilitate the removal of the bushing, a channel or groove is cut lengthwise on its outer surface through the short ends left by slot for chuck key. This leaves a thin wall in the bushing which can be easily broken in by driving a suitable "drift" into the opening formed by the groove; and breaking in the wall loosens the bushing so it can easily be removed.

The spring-clip stop is to prevent the keying ring from slipping off the chuck, should the chuck key be removed; and also in case it should be necessary at ony time to remove the keying ring, the spring-clip is simply forced off, the chuck key removed, and keying ring slipped off the chuck. Then, when it has been slipped back on the chuck, the spring-clip is again sprung into place.

Operation: Slip keying ring along chuck towards machine until the chuck key is free enough to allow the shank of drill steel to be slipped into place in the chuck; then press chuck key against the steel and push keying ring tightly on chuck key. This will hold the drill steel until the machine is made to strike a blow, then the momentum of the keying ring will force it more tightly on the tapering chuck key, and each succeeding blow will serve to hold the grip.

The tapering surfaces on chuck key and slot in keying ring are so proportioned as to give efficient wedge action and at the same time allow of keying ring being easily unkeyed by striking it a blow on its large end, a suitable set hammer being provided to hold against the ring to prevent its being injured in unkeying. Pistons equipped with this device are furnished on order. Morse Bros. M. & M. Co., Denver.



Windlass.

WINCHES AND WINDLASSES.

For prospecting work it is necessary that equipment be secured that will be

(Continued on Page 32.)

Traylor Grinder—Hopper Open.

Traylor Grinder—Hopper Closed.

Capitalization and Dividends of North American Mines and Works

Gold, Silver, Copper, Lead, Nickel, Quicksilver and Zinc Companies.

NAME AND LOCATION OF COMPANY.	Authorized Capital Stock.	Shares Issued.	Shares Par Val.	Dividends Paid in 1907	Dividends Total to Date.	Latest Date.	Latest Amt.
a, g., Colo	$ 1,500,000	1,433,000	$ 1	.....	$ 73,780	Dec. 1904	$0.01
s, s, l, c, Colo	1,500,000	150,000	10	.....	746,000	Jan. 1905	.05
, Con., q, Cal	500,000	100,000	5	.....	325,000	April. . . . 1900	.15
a Goldfields, Alaska	1,500,000	250,000	5	.....	260,000	Jan. 1901	.15
a Mexican, g, Alaska	1,000,000	180,000	5	90,000	1,595,381	Jan. 28 . 1907	.50
a Treadwell, g, Alaska	5,000,000	200,000	25	200,000	8,585,000	Jan. 28 . 1907	1.00
a United, g, Alaska	1,000,000	180,200	5	54,060	280,200	Jan. 28. . 1907	.30
Mont.	1,000,000	400,000	25	.....	1,115,000	Jan. 1899	.05
gamated, c, Mont.	155,000,000	1,530,879	100	6,123,518	49,540,746	May 27. . 1907	2.00
Sm. & Ref., com, U. S	50,000,000	500,000	100	1,750,000	10,500,000	April 15 . 1907	1.75
Sm. & Ref., pf, U. S	50,000,000	500,000	100	1,750,000	24,331,553	April 1. . 1907	1.75
Sm. Securities, A pf, U. S	17,000,000	170,000	100	510,000	2,295,000	June 1 . 1907	1.50
Sm. Securities, B pf, U. S	30,000,000	300,000	100	750,000	3,000,000	June 1 . 1907	1.25
Zinc, L. & Sm., Mo	3,750,000	150,000	25	.....	180,000	Jan. 1904	1.00
nda, c, Mont.	30,000,000	1,200,000	25	4,200,000	35,100,000	Apr. 18. . 1907	1.75
Laurie, g, Utah	5,000,000	25,000	100	.....	439,561	Apr. 1905	.50
tic, c, Mich	2,500,000	100,000	25	.....	990,000	Feb. 1905	.50
Butte, g, s, Mont	250,000	200,000	1	.....	1,337,148	Jan. 1904	.12½
, c, Mich.	2,500,000	100,000	25	.....	2,650,000	Dec. 17. . 1906	8.00
Tunnel Con., Utah	1,000,000	1,000,000	1	200,000	800,000	May 20 . 1907	.04
n. q. Cal	1,000,000	100,000	10	.....	20,000	Apr. . . . 1903	.06
n & Colo. Sm., Colo	750,000	15,000	10	.....	402,350	Oct. . . . 1902	.75
n Gold Copper, Sm., Colo	1,000,000	1,000,000	1	.....	150,000	Nov. . . . 1901	.02½
n & Mont. Con., c, s, g, Mont	3,750,000	150,000	25	3,600,000	54,325,000	May. . . . 1907	12.00
e, l, s, Colo	5,000,000	200,000	25	.....	200,000	June. . . . 1903	.05
wick Con., g, Cal	500,000	135,770	1	.....	13,577	Dec. 20. . 1906	.03
o Hump, g, Idaho	1,000,000	100,000	10	.....	300,000	Jan. . . . 1901	.10
n-Beck & Champion, Utah	1,000,000	100,000	10	20,000	2,770,000	Apr. 15. . 1907	.10
r Hill & Sullivan, Idaho	3,000,000	300,000	10	900,000	8,766,000	May 4 . . 1907	.60
& Boston, c, Mont	2,500,000	200,000	25	.....	1,800,000	Feb. . . . 1904	1.00
Coalition, c, Mont	15,000,000	1,000,000	15	1,000,000	1,800,000	June 26 . 1907	.50
rfly Terrible, g, Colo	1,500,000	1,250,000	1	.....	31,250	Oct. . . . 1901	.00½
iet & Arizona, c, Ariz	2,500,000	200,000	10	2,000,000	8,000,000	June 1 . 1907	5.00
iet & Hecla, c, Mich	2,500,000	100,000	25	2,000,000	101,350,000	Mar. 22. . 1907	20.00
Bird, g, Colo	5,000,000	820,000	5	393,600	3,427,704	Apr. 27. . 1907	.24
, g, s, c, Utah	500,000	500,000	1	.....	140,000	Dec. . . . 1906	.01
r g, Colo	1,000,000	900,000	1	.....	26,160	Apr. . . . 1904	.00½
nnial Eureka, g, s, l, c, Utah	5,000,000	100,000	25	.....	2,917,700	Feb. . . . 1905	1.00
r Creek, l, z, Mo	1,000,000	10,000	10	.....	200,000	June. . . . 1905	.10
al Eureka, g, Cal	4,000,000	400,000	10	.....	799,159	Mar. . . . 1906	.05
ry, g, s, l, Utah	150,000	150,000	1	3,000	33,000	Feb. 15. . 1907	.02
pion, c, Mich	2,500,000	100,000	25	200,000	1,800,000	June . . . 1907	1.00
& N., g, Colo	1,500,000	1,431,900	1	.....	229,104	Dec. . . . 1904	.01
n, g, s, Colo	100,000	1,000	100	.....	60,000	Dec. . . . 1903	.30
ibus Con., g, s, Utah	1,500,000	283,333	5	99,167	99,167	Apr. 5. . . 1907	.20
n, Idaho	500,000	400,000	1	.....	4,000	Aug. . . . 1906	.01
ination, g, Nev.	400,000	360,000	1	.....	873,000	Dec. . . . 1906	.15
Cal. & Va., s, g, Nev	540,000	216,000	2½	.....	3,963,600	July. . . . 1901	.10
Mercur, g, Utah	5,000,000	1,000,000	5	.....	1,180,000	Dec. 19. . 1906	.02½
lidated, g, Colo.	2,500,000	1,900,000	1	.....	380,000	Mar. . . . 1902	.01
ental, z, Mo.	550,000	22,000	25	22,000	209,000	Apr. 1. . 1907	.50
r Range Con., Mich.	38,500,000	383,781	100	767,562	4,989,153	Apr. 1. . . 1907	2.00
e & Cripple Creek, g, Colo.	800,000	800,000	1	.....	16,000	May. . . . 1901	.02
e United, g, Colo	500,000	500,000	1	.....	187,500	July. . . . 1906	.00½
e Creek, g, pf, Colo	125,000	125,000	1	.....	45,000	Jan. . . . 1902	.04
e Creek Con., g, Colo	2,000,000	2,000,000	1	.....	180,000	Mar. . . . 1905	.00½
s, g, Calif.	1,000,000	200,000	5	.....	227,300	Aug. . . . 1901	.05
ed King, g, s, Ariz.	6,000,000	600,000	10	.....	242,760	May. . . . 1901	.02
& Lark, g, s, l, Utah	2,500,000	2,500,000	1	.....	350,000	July. . . . 1901	.10½
Judge, Utah	300,000	300,000	1	225,000	225,000	Apr. 12. . 1907	.37½
g, s, l, Utah	3,000,000	150,000	20	.....	2,925,000	Mar. . . . 1897	.25
West, g, s, l, Utah	3,600,000	180,000	20	108,000	5,507,000	Mar. 15. . 1907	.60
mar, g, s, Idaho	400,000	67,180	5	.....	2,926,370	May. . . . 1905	.72
rood-Standard, pf, So. Dak.	600,000	600,000	1	.....	6,000	Dec. . . . 1903	.01
r Con., g, Utah	310,000	10,000	1	.....	5,850	June. . . . 1901	.10
ndfield, g, Nev.	1,000,000	732,000	1	.....	14,650	Sept. . . . 1905	.02
, g, Colo.	1,250,000	1,250,000	1	.....	156,250	Nov. . . . 1905	.01
r-Jack Pot Con., g, Colo	3,000,000	3,000,000	1	.....	267,000	July. . . . 1906	.00½
Run, l, Mo.	10,000,000	59,062	100	59,062	1,106,134	Apr. 15. . 1907	.50
n Con., g, Colo.	3,000,000	2,500,000	1	75,000	1,570,200	Apr. 24 . 1907	.01½
so. g, Colo	2,500,000	2,500,000	1	.....	1,242,045	Dec. 24. . 1906	.02
e, z, Wis.	30,000	500	60	25,000	230,000	May 15 . 1907	10.00
al Sm., com., Idaho	10,000,000	60,000	100	300,000	2,073,750	Apr. 15 . . 1907	5.00
al Sm., pf, Idaho	20,000,000	120,000	100	210,000	2,674,250	Mar. 15. . 1907	1.75
ice, s, Mont	2,500,000	400,000	5	.....	223,780	Mar. . . . 1900	.05
es Mohawk, g, Nev	1,000,000	910,000	1	182,000	318,500	Apr. 1. . . 1907	.10
Coinage, g, Colo.	1,000,000	10,000	100	.....	160,000	Dec. 1902	.20
d-Keystone, Utah	500,000	5,000	100	.....	1,550,000	Dec. 1906	10.00
Coin of Victor, Colo.	1,000,000	1,000,000	1	.....	1,230,000	Jan. . . . 1903	.01
Dollar Con., g, Colo	2,500,000	2,500,000	1	.....	25,000	Dec. 15. . 1906	.00½
King Con., g, Colo	6,000,000	5,750,370	1	.....	1,197,334	Dec. . . . 1905	.01
Hope, g, s, Colo	50,000	500	10	.....	150,000	Nov. . . . 1906	.25
y Con., c., B. C	15,000,000	135,000	100	405,000	2,158,630	Mar. . . . 1907	3.00
Central, g, Utah	250,000	250,000	1	70,000	1,228,750	May 15 . 1907	.04
Valley Exploration, Calif	100,000	30,000	2	.....	30,000	Jan. . . . 1900	.25
er Gold Belt, g, Colo.	5,000,000	3,800,000	1	.....	76,000	June. . . . 1900	.02
g, Calf.	1,000,000	100,000	100	.....	941,250	Jan. . . . 1903	.25
stake, g, S. D	21,840,000	218,400	100	436,800	16,080,350	Apr. 25. . 1907	.50
Silver, g, s, c, z, l, Utah	10,000,000	400,000	25	20,000	5,602,000	Mar. 30. . 1907	.05
ial, c, Ariz	5,000,000	500,000	10	200,000	300,000	June 25 . 1907	.20
endence Con., g, Colo.	2,500,000	2,500,000	1	.....	281,375	Apr. . . . 1901	.04
m Con., g, Colo	750,000	1,359,000	½	.....	33,981	Aug. . . . 1901	.00¼
national Nickel, pf, U. S.	12,000,000	89,126	100	267,378	802,130	May 1. . . 1907	1.50
g, s, l, Colo.	1,666,667	1,666,667	1	.....	405,505	Oct. . . . 1904	.01
Clad, g, Colo	1,000,000	1,000,000	1	.....	50,000	Nov. . . . 1906	.05
Silver, Colo	10,000,000	500,000	20	200,000	3,750,000	April 1. . 1907	.20
ls g, Colo	2,250,000	2,250,000	1	.....	742,500	Mar. . . . 1901	.01
son, g, Calif.	3,900,000	390,000	10	23,400	84,000	Apr. 18 . 1907	.03
ka, g, Colo	1,000,000	1,000,000	1	.....	10,000	Nov. . . . 1901	.01
ick & Gelder Sm., Colo	1,000,000	1,000,000	1	.....	20,000	Dec. . . . 1901	.01
all, g, Mont.	2,500,000	500,000	5	75,000	1,290,000	May 23 . . 1907	.03
edy, g, Calif.	10,000,000	100,000	100	.....	1,801,001	June. . . . 1900	.05
ortuna, g, Ariz.	250,000	250,000	1	.....	1,200,500	Oct. . . . 1902	.05
City, Colo.	50,000	50,000	1	.....	63,875	May. . . . 1900	.02
Dollar, g, Colo	1,500,000	1,500,000	1	.....	12,500	Dec. . . . 1905	.01
gton, g, Colo	1,250,000	1,250,000	1	.....	110,857	Jan. . . . 1906	.15
y Bell, g, Colo	700,000	130,551	1	.....	331,179	June. . . . 1906	.05
ner, g, Calif.	125,000	102,225	1	.....	240,000	Mar. . . . 1903	.02

Corrected to July 5, 1907.

NAME AND LOCATION OF COMPANY.	Authorized Capital Stock.	Shares Issued.	Shares Par Val.	Dividends Paid in 1907	Dividends Total to Date.	Dividends Latest Date.	Dividends Latest Amt.
Lucky Budge, z, Mo.	40,000	400	100	.....	46,800	Apr. . . . 1905	12.00
Lyon, z, l, Mo.	50,000	4,585	10	.....	2,117	Jan. . . . 1905	.20
Mammoth, g, s, c, Utah	10,000,000	400,000	25	.....	2,140,000	Dec. 20. . 1906	.05
Mary McKinney, g, Colo.	1,500,000	1,304,252	1	78,256	801,766	Apr. 25. . 1907	.03
Midget, g, Colo.	1,000,000	1,000,000	1	.....	195,000	Apr. . . . 1902	.15
Miller, Colo.	3,000,000	30,000	100	6,000	16,500	Jan. 31. . 1907	.03
Modoc, g, s, Colo.	500,000	500,000	1	.....	270,000	Dec. . . . 1903	.01
Mohawk, c, Mich.	2,500,000	100,000	25	400,000	900,000	Jan. 10. . 1907	4.00
Monitor, Idaho	1,000,000	1,000,000	1	9,200	9,200	Feb. . . . 1907	.01
Mont. Ore Purchasing, g, s, l, Mont.	2,500,000	81,000	25	1,215,000	9,448,119	Jan. 29. . 1907	15.00
Montana Tonopah, g, Nev.	1,000,000	885,000	1	.....	131,250	Aug. . . . 1905	.10
Morning Star Drift, g, Calif.	240,000	2,400	100	.....	854,400	Sept. . . . 1900	3.00
Mt. Diablo, s, Nev.	5,000,000	50,000	100	.....	260,271	Jan. . . . 1900	.10
Mt. Rosa, g, Colo.	1,000,000	994,850	1	.....	19,897	Nov. . . . 1905	.01
Napa Con., q., Calif.	700,000	100,000	7	.....	1,800,000	Oct. . . . 1902	.10
National Lead, com, U. S.	15,000,000	150,000	100	487,500	2,128,986	July 1 . . 1907	1.25
National Lead, pf, U. S.	25,000,000	250,000	100	875,000	17,407,580	June 15 . 1907	3.75
Nevada Hills, g, Nev.	5,000,000	750,000	5	75,000	150,000	Mar. 20. . 1907	.10
Nevada Keystone, g, Nev.	1,000,000	638,877	1	.....	61,700	Feb. . . . 1904	.03
Nevada King, Nev.	1,000,000	500,000	1	10,000	10,000	Apr. 25. . 1907	.02
New Century, z, Mo.	150,000	150,000	1	7,500	200,300	May . . . 1907	.01
New Idria, q, Cal.	500,000	100,000	5	40,000	920,000	Apr. 1. . . 1907	.20
New Jersey, z, U. S.	10,000,000	100,000	100	600,000	10,200,000	May . . . 1907	3.00
New Leadville Home, g, Colo.	2,000,000	2,000,000	1	.....	265,500	Feb. . . . 1902	.05⅝
New Zealand Con., g, Colo.	1,000,000	675,000	1	.....	129,600	Mar. . . . 1902	.01
North Butte, c, g, s, Mont.	9,000,000	400,000	15	1,600,000	5,000,000	June 25 . 1907	2.00
North Star, g, Cal.	2,500,000	250,000	10	50,000	1,356,356	Mar. 28. . 1907	.20
Northern Light, g, s, Utah.	2,000,000	400,000	5	.....	20,000	Feb. . . . 1904	.05
Nuggett, g, Colo.	1,000,000	991,000	1	.....	84,730	July. . . . 1901	.01
Old Colony Zinc, Mo.	1,000,000	69,909	10	.....	138,184	Nov. . . . 1901	.25
Old Gold, g, Colo.	2,101,150	2,101,150	1	.....	10,506	Mar. . . . 1904	.00½
Ontario, s, l, Utah.	5,000,000	50,000	100	.....	14,962,500	Dec. . . . 1902	.30
Ophir, g, s, Nev.	302,400	100,800	3	.....	1,797,400	July. . . . 1904	.25
Osceola, c, Mich.	2,500,000	96,150	25	576,900	6,362,000	Jan. 24. . 1907	6.00
Osceola, l, z, Mo.	500,000	98,000	5	39,200	225,400	Apr. 25. . 1907	.10
Ousatomah, g, Cal.	250,000	250,000	1	.....	12,500	Mar. . . . 1904	.05
Parrot, c, Mont.	2,300,000	229,850	10	114,924	6,864,720	June 19 . 1907	.25
Pennsylvania Con., g, Cal.	5,150,000	51,500	100	.....	326,125	Mar. . . . 1906	.10
Penn-Wyoming, c, Wyo.	10,000,000	5,500,000	1	137,500	531,250	Apr. 15. . 1907	.01¼
Petro, g, s, Utah.	800,000	800,000	1	.....	65,000	Aug. . . . 1906	.04
Plumas-Eureka, g, Cal.	1,406,250	150,625	10	.....	2,831,294	Apr. . . . 1901	.06
Portland, g, Colo.	3,000,000	3,000,000	1	240,000	7,337,080	Apr. 25. . 1907	.04
Quartette, Nev.	1,000,000	100,000	10	30,000	355,000	Mar. 30. . 1907	.15
Quicksilver, pf, Cal.	4,300,000	43,000	100	.....	1,931,411	May. . . . 1903	.50
Quincy, c, Mich.	3,750,000	150,000	25	1,350,000	17,945,000	June 10 . 1907	4.50
Quincy, l, s, g, c, Utah	75,000	125,000	½	.....	1,100,000	Mar. . . . 1902	1.50
Raisbeck Fairplay, z, Wis.	12,000	12,000	1	.....	1,200	June. . . . 1906	.10
Richmond, g, s, l, Nev.	1,350,000	54,000	2	.....	4,453,797	Dec. . . . 1900	.01
Red Bird, g, s, c, l, Mont.	1,500,000	300,000	5	.....	72,000	Dec. . . . 1904	.01
Red Metal, Mont.	1,000,000	100,000	10	400,000	1,200,000	Mar. 1. . 1907	4.00
Red Top, g, Nev.	1,000,000	1,000,000	1	.....	50,000	Feb. . . . 1906	.05
Rob Roy, z, Mo.	15,000	14,325	1	.....	11,969	May. . . . 1906	.03
Sacramento, g, Utah.	5,000,000	1,000,000	5	.....	308,000	Dec. . . . 1906	.00½
St. Joseph, l, Mo.	20,000,000	1,000,000	10	150,000	5,138,357	Mar. 15. . 1907	.15
Santa Rita, g, Colo.	1,000,000	1,000,000	1	.....	4,000	July. . . . 1900	.02
St. Rose, z, Wis.	75,000	750	100	.....	22,500	May. . . . 1906	6.00
Shannon, c, Ariz.	3,000,000	300,000	10	150,000	450,000	Mar. 30. . 1907	.50
Silver Hill, g, s, Nev.	180,000	180,000	1	.....	82,800	Mar. . . . 1906	.05
Silver King, g, s, l, Utah.	3,000,000	150,000	20	150,000	10,900,000	Mar. . . . 1907	.33⅓
Silver Shield, g, Utah.	300,000	300,000	1	.....	4,500	Feb. . . . 1901	.00½
Smuggler, s, l, z, Colo.	1,000,000	1,000,000	1	.....	2,235,000	Nov. . . . 1906	.03
Snowstorm, Idaho	1,500,000	1,500,000	1	135,000	225,000	Apr. . . . 1907	.03
Southern Boy, g, Colo.	1,250,000	875,000	5	.....	17,500	May. . . . 1900	.02
Standard Con., g, s, Cal.	2,000,000	178,394	10	17,839	4,240,597	Mar. 26. . 1907	.10
Standard, c, Ariz.	500,000	400,000	1	.....	40,000	Sept. . . . 1902	.50
Stratton's Cripple Creek, Colo.	2,000,000	2,000,000	1	50,000	100,000	Mar. . . . 1907	.02½
Stratton's Independence, g, Colo.	5,500,000	1,000,007	5	.....	5,028,568	Dec. . . . 1906	.12½
Stratton's Leasing, Colo.	500,000	500,000	1	.....	50,000	Jan. . . . 1906	.10
Strong, g, Colo.	1,000,000	1,000,000	2	.....	2,275,900	July. . . . 1905	.02½
South Swansea, z, s, l, Utah.	300,000	300,000	1	.....	170,000	Apr. . . . 1904	.01
Swansea, s, l, Utah.	500,000	100,000	5	5,000	334,500	Mar. 20. . 1907	.05
Syndicate, g, Cal.	100,000	100,000	1	.....	82,000	Aug. . . . 1902	.02
Tamarack, c, Mich.	1,500,000	60,000	25	180,000	9,180,000	Jan. 24. . 1906	3.00
Tennessee, c, Tenn.	5,000,000	200,000	25	250,000	1,125,000	Jan. 28. . 1907	1.25
Tetro, g, l, Utah.	300,000	300,000	1	.....	18,000	Dec. . . . 1904	.01
Tomboy (New), g, s, Colo.	1,500,000	300,000	5	.....	1,803,000	Dec. . . . 1906	.50
Tonopah-Alpine, g, Nev.	700,000	700,000	1	.....	70,000	Dec. . . . 1903	.10
Tonopah-Belmont, g, Nev.	2,000,000	1,150,000	1	115,000	356,500	April 1. . 1907	.10
Tonopah Extension, g, s, Nev.	1,000,000	928,433	1	.....	278,530	Apr. . . . 1906	.15
Tonopah, g, s, Nev.	1,000,000	1,000,000	1	700,000	2,650,000	Apr. 22. . 1907	.35
Tonopah-Midway, g, Nev.	1,000,000	1,000,000	1	50,000	250,000	Jan. 1. . . 1907	.05
Town Topics, g, s, Colo.	1,000,000	1,000,000	1	.....	50,000	Nov. . . . 1903	.00½
Trimountain, c, Mich.	2,500,000	100,000	25	.....	300,000	June. . . . 1903	1.50
Trinity County, g, Cal.	1,000,000	99,003	10	.....	34,561	July. . . . 1903	.05
Uncle Sam Con., Utah.	500,000	500,000	1	.....	145,000	Dec. . . . 1906	.01
Union, g, Colo.	1,250,000	1,250,000	1	.....	444,244	Jan. . . . 1903	.02
United, c, pf, Mont.	5,000,000	50,000	100	150,000	1,500,000	May 15. . 1907	3.00
United, c, com, Mont.	45,000,000	450,000	100	1,687,500	5,337,500	Apr. 29. . 1907	1.75
United, z, l, pf, Mo.	1,000,000	14,556	25	14,556	196,971	Apr. 15. . 1907	.50
United, z, l, com, Mo.	5,000,000	92,400	5	.....	27,490	Oct. . . . 1903	.05
United (Cripple Creek), Colo.	5,000,000	4,009,100	1	.....	280,071	Apr. . . . 1905	.00½
United Globe, c, Ariz.	2,300,000	23,000	100	.....	299,000	June. . . . 1906	6.50
United Metals Selling, U. S.	5,000,000	50,000	100	1,375,000	4,875,000	Apr. . . . 1907	7.50
United Verde, c, Ariz.	3,000,000	300,000	10	1,125,000	22,720,322	May . . . 1907	.75
U. S. Red. & Ref., com, Colo.	6,000,000	59,188	100	.....	414,078	Oct. . . . 1903	1.00
U. S. Red. & Ref., pf, Colo.	4,000,000	39,458	100	1,183,740	1,716,749	July . . . 1907	1.50
U. S. Sm., Ref. & Mg., com, U. S., Mex.	37,500,000	750,000	50	656,250	656,250	Apr. 15. . 1907	.87½
U. S. Sm., Ref. & Mg., pf, U. S., Mex.	37,500,000	469,748	50	822,058	1,967,528	Apr. 15. . 1907	.87½
Utah, s, l, Utah	1,000,000	90,000	10	13,500	242,000	May 14 . . 1907	.03
Utah Con., c, Utah.	1,500,000	300,000	5	1,350,000	6,486,000	Apr. 15. . 1907	1.50
Victoria, g, s, l, Utah.	250,000	250,000	1	30,000	192,500	May 15 . . 1907	.04
Vindicator Con., g, Colo.	1,500,000	1,500,000	1	90,000	1,605,000	Apr. 25. . 1907	.03
Wasp No. 2, g, S. D.	500,000	147,900	1	.....	240,595	Dec. . . . 1906	.01
West Mt. Placers, Utah.	500,000	248,300	1	.....	180,390	June. . . . 1906	.01
Wolverine, c, Mich.	1,500,000	60,000	25	600,000	4,530,000	Apr. 1. . . 1907	10.00
Work, g, Colo.	1,500,000	1,500,000	1	15,000	105,000	Apr. 1. . . 1907	.01
Yak, Colo.	1,000,000	1,000,000	1	60,000	767,685	Mar. 25. . 1907	.06
Yankee Con., g, s, l, Utah.	500,000	500,000	1	15,000	167,500	Jan. 21. . 1907	.03½
Yellow Aster, g, Cal.	1,000,000	100,000	10	10,000	593,000	May 4 . . 1904	.10
Zoe, g, Colo.	500,000	1,500,000	1	.....	7,500	Dec. . . . 1900	.00

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Leyner, J. Geo., Eng. Wks. Co., Denver
John A. Traylor Machy. Co., Denver.

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John A. Traylor Machy. Co., Denver.

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Colorado Iron Works Co., Denver.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

CORDAGE.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

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Colorado Iron Works Co., Denver.
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Hendrie & Bolthoff M.& S.Co., Denver.
Peter McFarlane Iron Wks., Denver.
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Hendrie & Bolthoff M.& S.Co., Denver.
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CYANIDE.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

CYANIDE MILLS.
Colorado Iron Works Co., Denver.
Fairbanks-Morse & Co.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

CYANIDE TANKS.
See Tanks, Cyanide.

CYANIDE (WOOD) TANKS.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

CYANIDE TANK PAINT.
Hendrie & Bolthoff M.& S.Co., Denver.
Western Elaterite Roofing Co., Denver.
John A. Traylor Machy. Co., Denver.

DIAMOND DRILLS.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

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Colorado Iron Wks. Co., Denver.
Hendrie & Bolthoff M.& S. Co., Denver.

DRYERS.
Colorado Iron Works Co., Denver.

DYNAMOS AND ELECTRICAL MACHINERY.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co. Denver.

ELATERITE ROOFING.
Western Elaterite Roofing Co., Denver.

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Fairbanks-Morse & Co.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

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Fairbanks-Morse & Co.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

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Fairbanks-Morse & Co.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

ELECTRIC PUMPS—SEE PUMPS.

ELECTRICAL SUPPLIES.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

ELEVATING MACHINERY.
Hendrie & Bolthoff M.& S.Co., Denver.
Colorado Iron Wks. Co., Denver.
John A. Traylor Machy. Co., Denver

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Interstate Clearing House, Denver.

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Fairbanks-Morse & Co.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

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Fairbanks-Morse & Co.
Hendrie & Bolthoff M.& S.Co., Denver.
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Schaefer Tent & Awning Co., Denver.
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Hendrie & Bolthoff M.& S.Co., Denver.
Colorado Iron Works Co., Denver.
John A. Traylor Machy. Co., Denver.

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Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

FORGINGS AND CASTINGS.
Colorado Iron Works Co., Denver.

FURNACES (SMELTING).
Colorado Iron Works Co., Denver.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

GOLD SEPARATOR AND AMALGAMATOR.
Gold Separator & Amalgamator, L. S. Pierce.

GRINDING MACHINERY.
Fairbanks-Morse & Co.
Hendrie & Bolthoff M.& S.Co., Denver.
Peter McFarlane Iron Wks., Denver.
John A. Traylor Machy. Co., Denver.

HAULAGE ROPE.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

HOISTING MACHINERY.
Fairbanks-Morse & Co.
Hendrie & Bolthoff M.& S.Co., Denver.
Peter McFarlane Iron Wks., Denver.
John A. Traylor Machy. Co., Denver.

HOISTING ROPE.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

HORSE WHIMS.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

HYDRAULIC SUPPLIES.
Fairbanks-Morse & Co.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

INJECTORS.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

JACKETS (WATER).
Colorado Iron Works Co., Denver.
Hendrie & Bolthoff M.& S.Co., Denver.
John A. Traylor Machy. Co., Denver.

JIGS.
Colorado Iron Works Co., Denver.
Hendrie & Bolthoff M.& S.Co., Denver.
Peter McFarlane Iron Wks., Denver.
John A. Traylor Machy. Co., Denver.

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(Continued from Page 24.)

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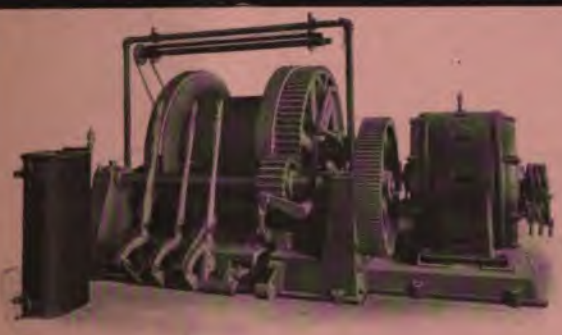

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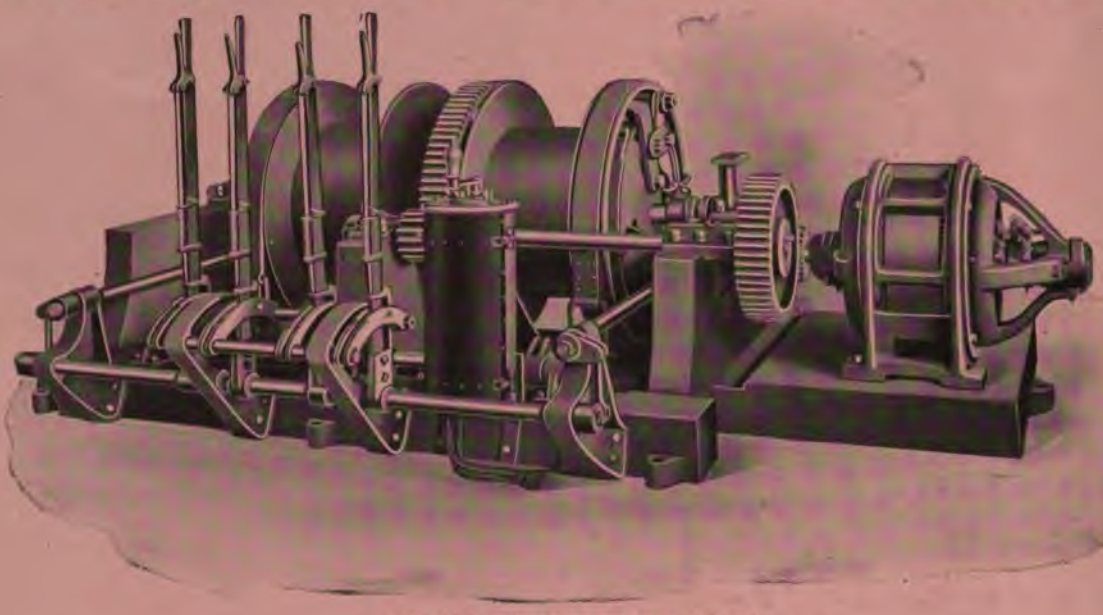

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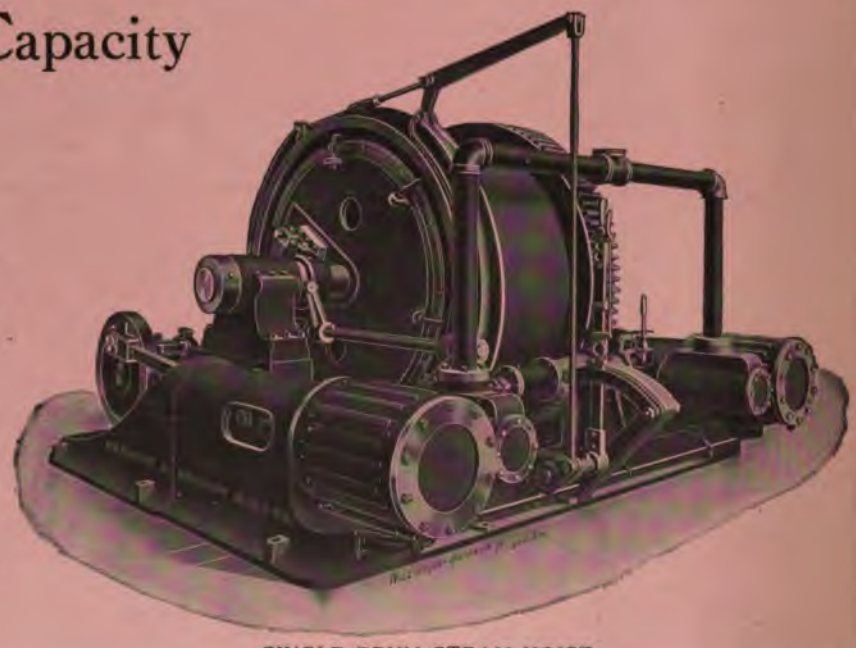

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WEEKLY

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The American Mining Congress

The tenth annual session of the American Mining Congress will be held at Joplin, Missouri November 11-16, 1907, beginning Monday and lasting the entire week. The official call is addressed to the President of the United States, chief executives of foreign nations, governors of states and territories, boards of trade, mayors of cities and towns, boards of county commissioners, chambers of commerce, mining bureaus and exchanges, miners' organizations, scientific societies, permanent members of the American Mining Congress and members of the press.

The purpose of the congress is to advance the mining and metallurgical industries in all their various branches within the United States; to assist in bringing about a more perfect co-operation between the government of the United States and the development of mining and metallurgy; to encourage education in practical and scientific mining and the dissemination of scientific information bearing upon the development of the metallic and non-metallic mining resources of the United States; to promote a more co-operative tendency in the evolution of agriculture, mining, manufacturing, transportation and commerce, and for the particular purpose of bringing the mining men of the United States into closer relation with one another and of promoting a friendly feeling for one another through social intercourse and the discussion of mutual interests.

The subjects to be discussed are to cover the entire mining field in all its departments.

At the Ninth Annual Session of this congress two laws were approved and recommended to the various state Legislatures for enactment; the first, for the protection of mining investors, was enacted by a number of states, and it is anticipated that legislation of similar character will be approved in all the states. The second, for the creation of mine drainage districts, met the opposition of those whom it was designated to force into bearing in proportion to benefits received, their shares of the expense of drainage of districts where a drainage system would benefit all property within their boundaries.

At the coming session reports of the following will be received and considered:

General Revision of Mining Laws.

Laws for the Prevention of Mine Accidents.

Side-Line Location Law, abolishing extralateral or apex rights.

Law for the Protection of Mining Investors.

Members and delegates are requested to formulate such changes in existing laws as seem desirable, and to communicate with the secretary at an early day, in order that such suggestions may be put in form to receive proper consideration.

Officers and directors of the Congress are: J. H. Richards, president; Thomas Ewing, first vice president; E. R. Buckley, second vice president; E. A. Colburn, third vice president; Dr. W. S. Ward, curator, J. F. Callbreath, Jr., secretary.

Directors—J. H. Richards, Boise, Idaho; Thomas Ewing, Vivian, Arizona; E. R. Buckley, Rolla, Missouri; E. A. Colburn, Denver, Colorado; George W. E. Dorsey, Fremont, Nebraska; C. M. Shannon, Los Angeles, Calilifornia; John Dern, Salt Lake City, Utah; A. L. White, Lima, Ohio; W. F. R. Mills, Denver, Colorado.

The Country Prosperous

Former Secretary of the Treasury Leslie M. Shaw, authorizes the publication of the following statement in relation to the financial and industrial conditions of the country.

"Our produce is more than $6,500,000,000 per annum, and the prospect is good for an average crop. Our mines yield more than $1,500,000,000 and our forests more than $1,000,000,000, and neither of these sources of wealth has been exhausted. The output of our factories in other than food products is $12,000,000,000, and no fires have been extinguished. The railways earn more than $2,000,000,000 and they are all in successful operation. The payrolls of our factories and railways aggregates approximately $3,500,000,000, and the scale of wages has not been reduced.

"In other words the real resources of the people's wealth have not yet been affected, and the ability of industrial concerns to pay dividends is not measured by the market price of their stocks.

"Logical reasons are never wanting. The people will have exactly what they expect. If those who have money in the banks withdraw it and lock it up; if the banks refuse to grant accommodations, and if the consuming public declines to place orders, then we will very soon witness the effects. Let those who think that times of disaster follow each other at regular intervals bear in mind that this country never yet experienced a period of severe depression that was not traceable to financial and economical agitation or legislation, and usually to both.

"Some check in the speed at which we are going is most desirable and the checking process has already begun. It will require a fair measure of confidence and courage to prevent undue retardment in our industries. Capital cannot be urged into activity, but it can be forced out of activity. I have never seen the time when universal sanity was more essential to our well being.

The Card System Dispensed With

Manager Bulkeley Wells of the Smuggler-Union Mining Company at Telluride, has done away with the card system at that great mine and mill and has issued the following notice:

"Notice is hereby given that the card system of employment heretofore adopted by the Telluride Mine Operators' Association is herewith discontinued by the Smuggler-Union Mining Company. All men desiring employment in either mine or the mill must apply at the company's office at Pandora. No men will be given employment at the mine or the mill by the company or its lessees unless they have first been approved for employment at the Pandora office, and no member of the Western Federation of Miners or its local union will be given employment. (Signed)

"THE SMUGGLER-UNION MINING COMPANY,

"By BULKELEY WELLS, Manager."

While the Tomboy company has not entirely revoked the card system on that property, it has been practically in disuse for more than a year, and the manager, D. Herron, does not deem it necessary to give notice that it has been discontinued.

At Miners' union headquarters the local officers have few comments to make relative to the action of Manager Wells. They say they will wait and see how strictly the new rule is enforced. They claim that more than half of the present employes of the Smuggler-Union are members of the union, and if the manager discriminates against the union men already in the employ of the company, or those who made application for work, they will ask for a conference with the manager, as they did with Superintendent Chase of the Liberty Bell, which terminated so satisfactorily.

In all probability the card system will soon be abolished wherever it exists in the state.

About all the camps in the state are short of miners and a policy should be established that will encourage them to come in.

Kaolin or Potter's Clay

A miner writes us from Goldfield, inquiring if there is any market in Denver for kaolin. At present there is not.

Kaolin is found in granite, and generally arises from the decomposition of the felspar in the rock.

It is essentially a hydrated silicate of alumina, and occurs in many places in very extensive beds as an earthy powder, and is derived principally from the decomposition of the felspars of granites, gneissic and felsitic rocks. It is extensively used in the manufacture of porcelain.

The name kaolinite was first applied by Johnson and Blake to the pearly scales which are at all times present in various quantities in all kaolin.

In the manufacture of porcelain after being levigated, it is ready for the pottery. The material is sometimes called China clay.

A good article of the crude clay is worth at the factory $10 to $15 a ton. There used to be pottery works at Golden, this state, and the kaolin was obtained on the ground, but the beds are mostly worked out and little or no pottery is manufactured there now. Some of the old kiln walls remain, but that is about all. These works are now owned by Ohio people, but very little pottery is calcined there at the present time. There are no other pottery works in the Rocky mountain country, to our knowledge. In Colorado there are scores of kaolin beds and in time they will be utilized.

Transmission of Electric Power

A demonstration of the enormous capabilities of California rivers in the direction of power development is under way on the Feather river, about twenty miles north or Oroville in Butte county, where the river merges from the foothills into the broad valley of the Sacramento. At the point selected the river makes a great bend of horseshoe shape, at least fifteen miles in circumference, and rapidly descends throughout the entire distance. The neck of the bend is but 15,000 feet across where the horseshoe begins, but the channel of the river is over 500 feet lower than at the upper point. These natural conditions create a splendid opportunity for the creation of electric power.

The Great Western Power Company of California has undertaken the work, backed with a large capital and the best engineering talent. It is proposed to drive a tunnel through to the bank of the lower stream, twenty-five feet square, and to concrete the walls the entire length, thus allowing the whole volume of the Feather river to flow uninterruptedly to the opening 15,000 feet away, and discharge at a point 500 feet above the river bed. The flood will be diverted from the upper stream by a dam built across the chasm, a work which involves no special engineering difficulties. At the level of the river the power house is to be erected, large enough to contain eight units of 15,000 electrical horsepower each. At first only half this power will be installed, the balance being added later. It is expected the plant will be in working order in June, 1908.

It is the intention of the company to furnish power only in large amounts and to lease the general business of supplying smaller services to others. It is expected that transmission will be effected to San Francisco, from which the plant is about 175 miles distant.

A. D. Goehring of Denver, has brought to the city probably the largest smoky topaz crystal ever found. He was prospecting in Jack Creek canon, fourteen miles west of Sedalia, and about eighteen miles south of Littleton. It is twenty-one inches long, thirty-five inches in circumference, weighs ninety-nine pounds and has six perfect sides. This enormous crystal was blasted out with giant powder and brought to Denver. Mr. Goehring says there is a vein of ore one-half to two inches wide along-side the topaz that assays $12.05 in copper and $8.10 in gold. The shaft, or prospect pit is fifteen feet deep and carries in addition to topaz and ore a considerable quantity of mica, though not in large sheets. He will continue prospecting in that place, out of curiosity, to see what else the ground contains. The topaz is remarkably fine for the manufacture of small stones.

The Marble Bay Copper Deposit

By O. E. Le Roy.*

During a reconnoissance survey of part of the southern coast of British Columbia, in the summer of 1906, the writer had an opportunity of examining briefly the ore deposits occurring on Texada island. One type of deposit is of particular interest, both on account of its being in a contact metamorphic zone and of its economic importance in containing valuable ores of copper.

Texada island, named by Elsa in 1791, lies in the Strait of Georgia, its southeast end being about eighty miles north of Victoria, and forty-seven miles from Vancouver. The town of Van Anda, where the chief mines are situated, is about seventy-five miles from Vancouver and is a port of call of the Union Steamship Company. The island has a length of thirty miles, with a maximum width of six and one-half miles. High and mountainous throughout, especially in the eastern half, where Mount Shepherd attains a height of 2,900 feet, it presents to the observer when viewed at a distance the appearance of part of a submerged mountain chain. The shores are very rugged with bold cliffs fringed in part with narrow boulder beaches. Sand and gravel beaches are few and there are only three harbors, Marble, Gillies and Blubber bays, the two latter being somewhat exposed in certain winds.

The island is underlain by the Vancouver series of Dawson, part of which has been referred to the Triassic. There seems, however, to be an entire absence of fossils in the associated limestones, and part if not all of the series may belong to the Paleozoic era. The series admits of two divisions. The lower is composed of chlorite and hornblende schists, tuffs, amygdaloidal lavas, porphyrites and agglomerates, which show over small areas obscure bedding. The upper division consists of limestone, which varies from a massive thick bedded unaltered rock to a fine grained pure white marble.

Subsequent to the deposition of the limstone there was considerable volcanic activity, and the whole of the Vancouver series was much disturbed by intrusions of diorite, gabbro, hornblende and augite porphyrites and diabases. The relations of these rocks with the limestones are well seen where they have intruded as dikes, sills and irregular masses faulting, and marbelizing the latter.

These igneous rocks, both older and younger than the limestones, have been much altered, and a large proportion of their present mineral content consists of secondary epidote, magnetite, chlorite, pyrite and calcite. They are widely developed and underlie the greater part of the island. The limestone, with the exception of a few small outliers, appears only at the northwest end, where the exposure has a length of seven and one-half miles, with a maximum width of two miles. In upper Jurassic times extensions of the great coast range batholith, consisting of granites and syenites, penetrated this older series and had a profound effect on them, producing schistose structure and shear zones in many of the igneous rocks, and converting the limestone to various crystalline types along with widespread faulting as the discordant strikes and dips now show.

The coast batholith was followed by a great series of basic dikes, principally diabases and all the older rocks have been cut by them.

The Cretaceous has a limited exposure at Gillies bay, consisting of feldspathic sandstones with calcite cement. The beds are probably basal, and are but slightly disturbed with low dips to seaward.

During the Glacial period the island was eroded by the Strait of Georgia glacier. A thin mantle of drift covers certain areas composed of sandy boulder clay, the boulders being principally varieties of granite from the main coast.

In the general depression which followed the island was much reduced in size, being some 400 feet lower with respect to sea-level than at present.

In the early '90s attention was first called to the occurrence of free gold in quartz veins, and later deposits of rich copper sulphides were found in the limestone. These latter were not considered of any great importance at the time, but subsequent development has proved the contrary. Both divisions of the Vancouver series contain valuable ore bodies, which are found in the eruptive rocks, at their contact with the limestone, and in the limestone.

In the eruptive rocks, the ores occur in shear and fracture zones, with quartz and country rock gangue. Much movement is shown by the slickensided walls, and later cross-fractures are filled with calcite. The ores are galena, zinc blende, copper and iron pyrites, carrying as a rule low values in gold and silver. The ore is also very pockety, and solid ore alternates with barren zones. The width of the veins varies from two to four feet, and one mine only, the Surprise, has been proved to a depth of 360 feet. Other veins contain pyrite chiefly and have been noted for the rich showings of free gold in quartz. These, unfortunately, were only surface enrichments and had no depth, the pyrite immediately below being practically barren.

Contact deposits between the various igneous rocks and the limestone, include the large and important bodies of magnetite situated on the south side of the island and owned by the Puget Sound Iron Company. On this property there is also a series of copper deposits—chalsopyrites and carbonates—along the contact of the limestone with the altered porphyrites or the magnetite. The ore occurs in rudely lenticular bodies lying at various angles from vertical to horizontal, the limestone being almost invariably the hanging wall or roof.

The important deposits of bornite and cholcopyrite, to which particular reference will be made, are found wholly in the limestone. At present two mines are being worked, the Marble Bay and Cornell. The Copper Queen, which was the pioneer mine of the district, is lying idle.

In 1897 an insignificant outcrop of copper and iron pyrites with some bornite, was found a quarter of a mile east of Stuart bay, on a crown granted lot owned by Christie & Palmer of Toronto. A shaft was sunk on the ore and drifts run, but it was not until the 260-foot level was reached that the ore body assumed a definite character.

In 1902 the property was purchased by the Tacoma Steel Company for $150,000, and it was extremely gratifying to the company to have been able to pay the whole of the purchase price in three years out of the profits earned by the mine. The mine is now 760 feet deep and 715 feet below high tide. The ore body from the 260-foot level to the present workings has varied in length from seventy-five to 115 feet and in width from a few inches to forty-five feet. On the first floor of the 760-foot level it is eighty-seven feet long, with a maximum width of thirty-two feet. From the 140 to 560 level the ore body pitched north at a high angle, but from there to the 760 it is practically vertical.

This deposit may be described as an ore shoot, occurring in a zone of brecciation in the crystalline lime-

*By permission of the director, Geological Survey of Canada. Abstract of paper read at Toronto meeting, 1907, Canadian Mining Institute.

stone, this zone being approximately parallel to the strike. Divided into subordinate shoots above the 360-level, it has, below that, been continuous. The borders are broadly irregular, and small stringers are given off which run a few inches into the country rock. In the upper levels the walls were brecciated and weak, but in the lower they are firm, and very little work is necessary in the way of lagging. The ore is bornite, with subordinate chalcoyprite, and a little pyrite, pyrrhotite and molybdenite. These occur in a gangue made up largely of pale green pyroxene—"green-felsite"—and reddish brown garnet—"bull-felsite"—with calcite. The ore is either finely disseminated through the pyroxene, or occurs in large, rather pure masses between the pyroxene and the limestone. Very little is found in the garnet.

A considerable proportion of the pyroxene gangue is partially altered, and disintegrates rapidly on exposure to the air. There are also large areas of the pyroxene which are practically barren. A microscopic examination of a few prepared sections of the gangue shows that the pyroxene (variety omphacite) occurs in mosaics of clear individuals with turbid borders. The garnet, which shows zonary structure, and optical anomalies, is traversed by numerous cracks, which are filled with turbid material, in part calcite. Towards the calcite, the garnet has a tendency to develop crystal outline. Bornite and chalcopyrite occur in small grains, solitary, or connected in groups by narrow stringers between the pyroxene individuals, inter-grown with them, or along cracks in them and the garnet. Calcite with the larger grains of the sulphides, well formed garnet-andradite—vesuvianite were the last to crystallize out and filled all the interstitial spaces.

Subsequent to the formation of the ore body it was cut by one of the later dikes of basic porphyrite. Between the seventh and eighth levels it varied in width from four to six feet, with ore on both sides. This dike dipped to the south, and in its downward extension became much reduced in size. On the 760-level it is only seven inches wide and crosses the drift some distance south of the ore body. It is highly altered with a development of numerous fissures now filled with epidoate and pyrite. This intrusion caused considerable movement in parts of the ore body, and many small fissures were formed and subsequently filled with chlorite, pyrite and calcite. Some beautiful examples of slickensided surfaces are seen, especialiy where molybdenite occurs. The pyroxene and garnet have both been fractured and under microscopic examination the former showed strain shadows, incipient and complete granulation, with considerable alteration. Bornite has been redeposited along these lines of fracture, between individual grains, and along cleavage planes. It occurs in solitary and connected grains and parallel bands. Calcite of the first generation shows strain shadows, and the last phase in the formation of the deposit was the filling up of all the small interstitial spaces with calcite. The order of crystallization was pyroxene and garnet, simultaneously, along with the greater part of the bornite, then the remainder of the bornite in larger masses associated with well formed garnets, vesuvianite and calcite.

This deposit is closely connected with the intrusion of the coast granite, and is clearly of pneumatolytic origin, being an example of the Kristinia type.†

The ore throughout is esentially high-grade and carries good values in gold and silver. The ore which is finely disseminated through the pyroxene gangue carries much higher values in gold and silver than the purer and more massive bornite and chalcopyrite. It has also been found that the percentage of copper has steadily increased with depth.

As it is necessary to mine considerable barren gangue which is intimately mixed with the productive, the ore is hand-sorted before shipping and graded into coarse and fines. The waste, on account of its fluxing properties, is shipped in large part and sold to the smelter. At present the total production is sent to the Tacoma smelter for treatment.

In order to ascertain the average value of the ore, the smelter returns for the year ending June, 1906, were examined with the following result:

Grade.	Gold oz. per ton.	Silver oz. per ton.	Copper per cent. (dry)	Net value per ton.
Coarse . ..	0.498	4.138	6.765	$28.77
Fines	0.1673	1.569	1.602	16.88
Waste Tr.-.08		0.15-0.9	.22-0.8	$0.50
Coarse . ..	1.006	5.73	11.25.	. ....

The last entry of coarse grade refers to a shipment of 116 tons made in July, 1906.

About 13,000 tons are mined annually, and approximately for every ton of coarse, two tons of fine and two of waste are shipped. Through the courtesy of Mr. F. C. Robinson of the Sheffield Smelting works, I am enabled to publish a few interesting assays which he made of the ore and gangue. The samples were taken from a stope on the 660-level,and the gold and silver values are stated in ounces per long ton.

No.	Gold.	Silver	Assays. Analyses.	I.	II.
I.	0.40	18.60	Ins'l . .	31.60	43.10
II. . ..	1.05	7.85	Cop. . .	34.00	13.60
III. . .	0.008	0.04	Iron . .	10.30	9.60
IV. . .	0.025	0.07	Lime . .	Trace....	

I. Bornite and chalcopyrite (massive ore).

II. Pyroxene and garnet gangue with finely disseminated bornite.

III. Calcite after removing mineralized portions.

IV. Calcite and garnet after removing mineralized portions.

Numbers III and IV are interesting in showing the occurrence of gold and silver in what was apparently barren gangue. Free gold in distinguishable leaves and grains has been found occasionally, but it is not common in occurrence.

†Genesis of Ore Deposits, Prof. J. H. L. Vogt, p. 648 et seq.; Waldemar Lindgren, p. 25 et seq. Trans. Amer. Inst. Min. Eng.—W. H. Weed, Ore Deposits near Igneous Contacts, Vol. XXXIII, p. 720.

DIAMOND IMPORTERS.

More than $36,000,000 worth of diamonds and other precious stones were imported into the United States during the past year. This importation of diamonds and precious stones is by far the largest in the history of the United States, the high water mark in earlier years having been $28,500,000 in 1903, while 1904 showed but $27,750,000. In the ten months of 1905 ending with the month of October the total is over $31,000,000, or more than any full year prior to 1905. This importation of the ten months, amounting to $31,359,157, gives an average of over $3,000,000 per month, so that it may reasonably be assumed that the figures for the two remaining months will bring the total up to $38,000,000, as against $27,750,000 in 1904 and $28,500,000 in 1903.

A deposit of cerussite (white lead ore, lead carbonate) in layers of 1-16 to 1-8 inch thick occurs at the Terrible mine at Ilse, Custer county, Colorado. The proportion of ore depends upon the number of layers. In some places the granulite averages ten per cent. lead, but the general average when the deposit was worked years ago yielded four to five per cent of metallic lead in the mill. Occasionally the cerussite has formed large masses, one of these weighing 115 pounds, having been exhibited at the Lewis & Clark exposition at Portland, Oregon. These masses are crystalline druses, having the appearance of white opaque vein quartz, and only show the crystal habit along occasional planes on their periphery. The cerussite is dull white, translucent, brittle and easily detachable in small plates from its rock matrix. It has no metallic impurities, and may be easily distinguished from calcite in its thin sheets by giving no effervescence with dilute hydrochloric acid.

Turning Dirt Into Dollars

Thomas F. Cole—the Man of the Hour in the Copper World: the Evolution of His Idea which Has Added Millions to National Wealth and the System which Has Made Mines Productive

By Claude Hurst Hare.*

Eight years ago the Copper Queen mine of Bisbee, Arizona, owned by the Phelps-Dodge interests, was the only producer of note in that district. But in 1899, one of the best known copper men of the country, Captain James Hoatson of Calumet, secured an option on eleven claims adjoining the Copper Queen and went to Calumet to secure money for development. After many discouraging approaches, he succeeded in securing the backing of a number of capitalists, men closely allied with the great iron mining industry of the Lake Superior region.

A development company was organized, the stock was floated, the mine opened—and proved a bonanza. From this development company sprang the Calumet & Arizona Mining Company, which today pays a dividend of $20 a share—ten per cent. on twenty times its par value—stock which cost the original owners 64 cents per share. Thus $640 in development stock today represents a value of $200,000.

But the great success of the Calumet & Arizona as a dividend payer counts for little compared with the idea it gave one man—the man in particular to whom its success was due; an idea of limited scope in infancy—but which has since developed achievements of such prominence that the country is beginning to acknowledge a new king has arrived in copper circles. For Calumet & Arizona was but the stepping stone to greater accomplishments for Thomas F. Cole, the man of the hour in the mining world.

Here is a man whose methods of management prove him to be the ablest mining executive of his time, a man whose development of Calumet & Arizona and North Butte show the possession of an almost intuitive judgment in considering "prospects"; a man whose reorganization of the Greene copper properties stamps him a financier and organizer of the first rank; a man whose amicable settlement of the famous dispute between Amalgamated, Standard Oil and F. Augustus Heinze marks him a great diplomat.

Concerning a man of such achievements it is natural that many have been asking: "Who is this man Cole, who succeeds where others fail?"

That question calls forth a story more interesting than a piece of fiction, as wonderful as the choicest dreams of a Stevenson or a Dumas. While it is an old story, the story of a self-made man, his life has been one of such extraordinary progress that it brims over with encouragement for others—encouragement to try, and to work and to grow—also to build on square dealing. Thirty-seven years ago when the Northern peninsula of Michigan was the center of a copper mining activity it has never since witnessed, young Cole, left fatherless by an accident in the Phoenix mine, began work at the age of eight on the rock piles around the Phoenix and Cliff mines. There he stayed for eight years, enjoying more promotions than usually fall to the lot of the breaker boy. Then came two years as brakeman on the Hecla & Torch Lake railroad; and another two years as a clerk in its office.

All this time Cole studied nights while he worked his regulation hours daytimes, so that when he crossed his 'teens he had the equivalent of a common school education, methodically acquired.

Then came his first big jump. His zeal for work which he could not hide, his manifest loyalty, and his experience beyond his years, had attracted attention from the owners of the largest iron mine on the Menominee range, the Chapin. A good man was needed as cashier and chief clerk. The responsibility was great, as the company employed over a thousand men. But his record was a testimonial the Chapin people could not overlook, and they decided that they wanted Cole. They got him.

Cole did his work as chief accountant well. But he did more: here was his opportunity to acquaint himself with all mining details; and he was soon familiar, not only with the physical operations of the mine, but also with its office work, and, still more valuable, its inner management and financial workings.

Again, prepared for it, the opportunity came.

Ferdinand Schlessinger of Milwaukee, then known as the Iron King, had secured control of a number of properties on the Menominee range. He needed a capable man to take charge of them. He looked far and wide for the right man, and finally selected Cole, much against the advice of his friends, who referred to Cole as "that boy."

In 1893 came the panic—nowhere more severe than on the ranges about Lake Superior. Mr. Schlessinger, like many others, was caught while attempting to expand his business, with little cash on hand; he was helpless. At this time Cole was at Negaunee in full charge of the Schlessinger interests. He took affairs in his own hands, even holding back the wages of the men—but with their consent, for they believed and trusted him. He took his own savings and added them to the sacrifice. Anything—everything—so long as it was honest and would help to save the business. His courage was marvelous—but his efforts were in vain. The mines were forced to shut down.

Cole Left to Fight Battles Against Creditors Single Handed

Mr. Schlessinger, down and out, afraid to face his creditors, fled to Mexico, leaving Cole to fight his battles. There was nothing to be done. The mines were closed* and Cole was out of a job.

But bringing wealth from the earth was his work. Within a short time he was in charge of the Norrie mine and several allied properties on the neighboring Gogebic range, and mining more ore than he had for Schlessinger.

Early in 1901, when the United States Steel Corporation was formed, he was offered the presidency of the Oliver Iron Mining Company, the ore end of the steel trust, a position he retains today—the president of the greatest ore mining company in the world, which last year mined nearly thirty-nine million tons of ore. Here Cole reached his highest development of mining management.

His reorganization of the Oliver Iron Mining Company has been the installation of a system which is as detailed as that of a small-margin factory, as exact as a bank's. One of his men was recently asked:

"How can Mr. Cole keep in touch with the business, when his other interests so often take him out of the city?"

"Easily," was the reply. "He has installed a system which keeps his finger always on the pulse of the institution. We can feel his presence when he is away as much as when he is at home. Not alone in the immense steel building in Duluth can we feel Mr. Cole's guiding hand at all times. Every employe—and there are over 20,-

*In System Magazine.

*The first work Cole did after the closing, was to secure enough to pay the men. Every cent coming to them was paid.

000 of them—on the five ranges controlled by the Oliver Iron Mining Company, recognizes his presence in the system which directs the workings of this vast army of employes."

Into the organization of the Oliver company, Mr. Cole has introduced a system whose pulse beats record the actions of a water boy in a mine on the Mesaba range—the number of feet a drill has penetrated on the Vermillion—the number of tons of ore brought to the surface in a mine on Gogebic range, several hundred miles away.

Where chaos reigned on his entrance, the most perfect harmony now prevails. Moreover, loyalty is a prominent attribute of the employes of the Oliver, and it grows out of the assurance of justice to all. The most insignificant office boy, if he has a just grievance, may tell it to Mr. Cole. Modest—shrinking from publicity of any kind—reticent at all times—yet a man of kindly ways and easily accessible, he has traits of the really great man.

When he became president of the world's greatest ore mining company, at the age of thirty-nine, Cole had reached the "top round," at least on the managerial side of mining. To him it was merely a preparatory course to his real achievements—and the best possible education, for it is doubtless his intimate knowledge of the operative and accounting and managerial side of mining that has made him the greatest mine developer of the day.

His Initial Venture in Mine Development.

No man could wish for a more favorable opening venture than Calumet & Arizona. To a great extent its early history parallels many other stories of discouragement ending in defeat—only in this case defeat was staved off by the will and genius of Cole.

Organized in 1899 as the Lake Superior & Western Development Company by a group of Calumet and Duluth men, it was capitalized at $200,000, divided into 20,000 shares of $10 each. Extraordinary obstacles and discouragements were met. Developing a mine under ordinary conditions is no child's task. But when the ore is supposed to lie only a few hundred feet below the surface and a shaft is dropping — dropping—dropping past the last level-distance of hope, with the excavation of every foot costing a tiny fortune, it takes a man with a strong heart and an iron will—a man with a "don't-give-up-the-ship" determination, to hold out against the disheartening grumblings of his co-directors and stockholders. It was not until in drifting from the shaft on the 700 and 800 foot levels that the ore was struck. Here the bonanza appeared—the body of wealth that was destined to make many of its stockholders independent for life.

But before this the original promoters had spent their money—and more. In 1901, to secure more money for development, the Calumet & Arizona Mining Company was formed, to take over the property. It was capitalized for $2,500,000 and divided into 250,000 shares of $10 each, 50,000 shares being left in the treasury. Of the remaining 200,000 shares, 100,000 were given in exchange for Lake Superior & Western Development Company's stock, at the ratio of five mining shares for one development share. The remaining 100,000 shares were sold to the public at $10 per share. The mining company also paid the development company $600,000 in cash, $464,000 of which went to pay off an indebtedness, the remaining $136,000 returned to the holders of the 20,000 shares of development stock, making $6.80 per share. Thus did the holders of the development stock secure five shares of the Calumet & Arizona mining stock for $3.20, or sixty-four cents for each share.

Shortly after the mining company was formed, the main pocket of the ore was struck and some time later the first dividend of fifty cents per share. From this small beginning it has gradually increased until today $5 per share is paid every three months.

That Thomas F. Cole was responsible for Calumet & Arizona's great success, there is no question. Without his guidance and determination to make it a mine, his associates would have given it up long before they struck the ore. It is this bull-dog tenacity characteristic of his, which has done much to make his mining so successful.*

It was North Butte, however, which first brought Cole into national prominence. Its rapid rise to a dividend basis was so spectacular that it could scarcely fail to attract the attention, not only of the leading financiers and mining men, but investors as well. For several years Mr. Cole has employed expert engineers to look up high grade prospects. They are his advance agents, so to speak. Mr. Cole learned of the situation in Butte. Amalgamated, Senator Clark and Heinze were supposed to have everything of value corraled. But every one has his vulnerable spot. That spot in these gentlemen was their belief that they had options on all property of value in the district.

Originally the Butte district was a gold and silver camp. These minerals lay near the surface. The copper came farther down. The Speculator mine was an abandoned silver mine—no good, said Amalgamated and Senator Clark and F. Augustus Heinze; neither was much of the ground adjacent to it.

A man appeared who knew a few things about geology and about mining. He went down into the deserted Speculator shaft some hundreds of feet and found—no copper, only worked out gold and silver lodes. But he discovered formations which gave him hope, nevertheless. Quietly he reported to headquarters. Shortly after an option was taken on the Speculator and adjacent property by Thomas F. Cole and associates of Duluth, and the North Butte Mining Company was born.

There is a large amount of risk attached to developing any copper property. Millions may be spent to no advantage. In North Butte the risk was as great as in many others. But it was reduced by two features: it was in the heart of the richest copper camp in the world; it had been examined by a most competent man, who declared that everything pointed to copper at greater depth. He was not mistaken. It required relatively only a small amount of sinking before the ore was tapped.

Mr. Cole's means of floating North Butte differed from his former deals in the fact that the Bisbee properties required more capital for development. At any rate, it would appear so, as from the surface, the presence of the ore in these properties was justified only by its presence in other properties in the district. But in North Butte, geology, mining experience and excellent judgment told him ore was near at hand.

In the Bisbee mines, development companies had been formed, a certain proportion of the capital paid in and assessments made as the money was needed. If when all was called, they were justified in continuing development, a new corporation, a mining company, could be formed to take over the property and to issue enough stock to promote further development.

But in North Butte a mining company was formed at the start—a corporation capitalized at $6,000,000, di-

*The great success of the C. & A. induced Mr. Cole and his associates to secure options on properties adjacent; and in a short time the Calumet & Pittsburg, Lake Superior & Pittsburgh, Pittsburgh & Duluth and Junction were organized and development started—these four and the C. & A. for several years being known as the Bonanza Circle of Bisbee. Last year these four properties whose original capital stock aggregated $11,500,000 were consolidated into one property now known as the Superior & Pittsburgh, with a capital of $20,000,000, of which $5,000,000 still remains in the treasury. This stock is now selling at about one hundred per cent above par.

vided into 400,000 shares of $15 each. This was placed on subscription on the seventeenth day of March, 1905, and was greatly over-subscribed the same day. The company now pays a dividend of $8.00 per year—eight per cent. on six and one-half times the par value. And greater things are in store for it, for every few months larger and richer bodies of ore are opened. Parenthetically, it might be interesting to know what the three original and undisputed "bosses" of the Butte district think of their judgment since North Butte has become a producer.

North Butte led Mr. Cole into one of his two really great achievements in copperdom—settlement of the great Heinze-Amalgamated controversy and the formation of Butte-Coalition.

The basis of this now famous controversy was simple. The same properties were claimed by two parties: by Heinze on the one side—hot-headed, a fight lover, with the "I-don't-give-a-care" feeling; Rogers on the other side—cool and stubborn, obsessed with the "I've-got-the-Standard-Oil-behind-me" idea. And neither would give a hair's breadth.

Just how Cole brought them together only he and they knew. But why he should have appeared as mediator is explanable.

His entrance into the Butte district had brought him into touch with John D. Ryan, manager of Amalgamated and Butte representative of Rogers. They were long-time friends, both old Michigan miners, and were doubtless drawn together at this juncture by the association of operating in the same camp. Cole has a horror of seeing anything go to waste. A hard worker himself, he dislikes to see idleness. Here were numerous properties lying idle—tied up in litigation—properties which might as well be earning millions in dividends.

Would it not be easy for him to say to Ryan: "Why does this litigation go on? Why do you not settle it?"

"Well, why don't you?" Ryan would retort.

"Put me in touch with Mr. Heinze and Mr. Rogers and I will settle it," Cole would answer.

Cole's solution was simple. "Sell me the properties," he said. I will form a new company, take them over, work them, make them productive.

Heinze and Rogers sold. Thus did Cole form Butte-Coalition*—a consolidation of the properties which Heinze had worked—perhaps unlawfully; and which Amalgamated claimed—perhaps also unlawfully.

Cole controls the actions of the directors of the Butte-Coalition, part of whom are Amalgamated men; and he is again associated with John D. Ryan, Standard Oil representative, in Hancock and in Greene-Cananea. The question has heretofore often been asked, "What will Amalgamated do to Thomas F. Cole?" His host of followers—and he has today the largest following with perhaps one waning exception, in the investment field*—he will never make a move that will injure his reputation for integrity, that whatever the outcome of his connection with the Standard Oil, his personal honesty will remain unblemished.

Reorganization of the Greatest Copper Property in the World.

North Butte on a paying basis, the Montana Copper fight settled, Cole started on his second achievement, which has only just reached its successful conclusion—the re-organization of the Cananea mines, now the largest copper property in the world.

In northern Mexico, close to the American boundary, lie great deposits of low-grade copper ores. Colonel William C. Greene has always been the "big man" of this district, and his mine, the Greene Consolidated, is the largest in the region.

Starting with little capital, Colonel Greene created through his own efforts one of the most important mining properties in the world. But the ores were low-grade, and in order to pay fair dividends the output must be enormous. Greene-Consolidated was a big mine, had a big smelter; but for such tremendous capacity it was running on too small a capital and was constantly pressed for cash. Colonel Greene was getting along in years, his health was poor, and it was only natural that he might welcome the opportunity to shift the responsibility of his big mine on other shoulders.

This was the situation when Cole entered the district. Together with John D. Ryan and Chester A. Congdon (a Duluth capitalist and an associate of Cole's in his various mining enterprises), he in 1906 secured from Lycurgus G. Lindsay of Cananea an option on a number of claims next to Greene-Consolidated, Colonel Greene, for his company, having already secured options on other ground lying immediately adjacent. In forming the Cananea Central Mining Company therefore it naturally followed that Colonel Greene should be included in his options. As a result, Greene Consolidated was given one-third of the capital stock of Cananea Central, in exchange for the property it had turned into the company; the remainder was absorbed by the directors, for no subscription was opened to the public.

The next step was logical—the absorption of Greene-Consolidated.

Would Colonel Greene consent. Many aggregations of capital had approached him without success. But in Cole the colonel was dealing with a man of unusual ability, with whom the management of his mine would be safe; Greene had had an opportunity

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*Mr. Cole himself explains the organization of this company in an open letter he has recently written:

"Butte Coalition Mining Company was organized with a capital stock of 1,000,000 shares, par value $15 per share. Several mines purchased from Mr. Heinze and associates for the sum of $10,500,000, and now owned by the Red Metal Mining Company, were put into the combination at exact cost, for the Coalition Mining Company owns every share of the Red Metal Mining Company.

"Control of the stock of the Alice Gold & Silver Mining Company, owning valuable mineral property in Butte City was bought at a very low cost and sold to Butte Coalition Mining Company, at exact cost. The difference between the capital, $15,000,000, and $11,000,000 above accounted for, is the sum of $4,000,000, that was placed in the treasury of the company and this sum of $4,000,000 and additional sums are now in its treasury.

"The mines are being developed on an extensive scale, are earning money and paying fair dividends. At no time has the stock sold below $20 per share, and then for a short time only during recent panicky times, and we know it was then selling below its real value."

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*Mr. Cole has this tremendous and super-loyal following because he has invariably been "square" with his friends and supporters. What he has done towards assisting old friends and new—really making fortunes for them—is as interesting as the story of his life. Hundreds of old-time friends whom he knew as a boy in Michigan have invested their savings under his guidance, to have them multiplied ten-twenty- and thirty-fold. Many are the instances where miners, broken down from their years of hard labor, have had their declining years eased for them through "Tom" Cole's kindness.

His benevolence is unlimited and his faith in mankind is great, until he has cause to distrust. Once a man is found unworthy, he is barred from Cole's list forever.

A traveling man recently told of being in Calumet on a very cold day last winter. The drayman who was unloading his trunks was thinly clad and wore no mittens. Stepping into a nearby store, the salesman bought a pair and gave them to the man, who acknowledge them with thanks. Going back into the store he was asked by the proprietor what he had done with them. When the salesman explained, the storekeeper fairly doubled with mirth.

"Why," he said, when he found his voice, "that man is a protege of Tom Cole's and owns 1,200 shares of North Butte, from which he draws $9,600 a year dividends."

Another case is the story of an old waiter in one of the leading hotels in New York, where Mr. Cole always stops when in that city. Several years ago, while at dinner, this old man asked Mr. Cole how he would advise him to invest his savings. "Buy North Butte," was Mr. Cole's laconic reply. The next day the waiter did as advised (North Butte then was worth about $21) and within a year he had $35,000 or $40,000.

In this way, Cole divides with his friends and neighbors. And while the reason doubtless has been his loyalty and bigness, the result has been distinctly profitable. For Cole has a human following which is worth to him, in his work, more than a piled-up surplus of millions in cash. When he puts his O. K. on a property or proposition it goes. So great is the faith of the people in him, that were he to attempt to put down a shart in the bottom of Lake Superior, it is verily believable that they would flock to enter their subscriptions for the stock.

to learn this through his contact with Mr. Cole in the Cananea Central. And both sides were inclined to look the situation squarely in the face: on one hand was a property with any quantity of low grade ore, a large smelter but no cash; on the other was a mine with high grade ore, no smelter, but with capital unlimited.

There could be but one result—a consolidation of Greene Consolidated and Cananea Central. The new company was known as the Greene-Cananea, with a capital of $60,000,000, of which $10,000,000 remains in the treasury. Mr. Cole was made president—the only property in which he is an officer, except Butte-Coalition.*

At forty-five, Thomas F. Cole stands as the recognized leader in mining circles. For real achievement in mining he stands almost alone. He has been a creator—not merely a promoter or market man, but a developer of mines and builder of properties. He has added nearly two hundred million dollars of value to the wealth of this country in the copper industry alone, and the fact that he strikes "pay dirt" so often, discloses a rare assortment of qualifications seldom found in one man.

His splendid foresight into the future; his ability to select careful, experienced, dependable engineers to locate the properties; his quick perception of value or absence of value; his ability to command capital—the all-important feature, founded on the rock of his personal integrity; these are the qualities which enable him to turn a hole in the ground into a bonanza mine—to turn dirt into dollars.

SCIENTIFIC WORK OF INTEREST TO OIL MEN.

A knowledge of the conditions that govern the accumulation of petroleum in pools is of the greatest practical value to the oil men, and investigations to determine these conditions have been carried on for a number of years by the geologists of the United States Geological Survey in various oil-producing districts. The results of some recent work of this kind in Pennsylvania, Ohio, and West Virginia, by Messrs. W. T. Griswold and M. J. Munn, have just been published by the Survey as Bulletin No. 318.

The investigations of Mr. Griswold and Mr. Munn involved the solution of two important questions: First, what are the physical laws under which oil accumulates in pools; and second, how many of the conditions of this accumulation can be determined prior to actual test by the drill. The area selected for study was that portion of the Appalachian oil field comprising the Steubenville (Ohio-West Virginia) and the Burgettstown and Claysville (Pennsylvania) quadrangles, within which lie most of the white oil-producing sands of the Appalachian field. The area about 680 square miles in extent, has been tested by numerous wells and includes large and important developed oil pools from the Berea, the Hundred-Foot, the Gordon, the Fourth and Fifth sands. Records of the conditions discovered by the test wells were collected, and a map of the principal oil-producing sands in each quadrangle was drawn to represent the sand as if all of the material above it had been removed and it upper surface exposed to view. From the facts thus assembled general laws applicable to the different oil accumulations have been deduced.

The chief factors in the accumulation of oil are the geologic structure of the oil-bearing rocks and the salt water contained in the different producing sands. These sands vary greatly in the extent of their saturation with salt water. The younger sands, or those nearer the surface, comprise much larger areas that are completely saturated, and the saturation decreases downward with each succeeding sand. The Fifth, the deepest sand from which oil has been produced within the region, contains salt water only in very small areas in the very lowest spots.

The oil has accumulated in different places with reference to the high and low points of the rocks, the place of accumulation depending upon the quantity of salt water contained in the sand rocks. In those sandstones that are completely saturated the oil is found on high places; where the oil sands contain water only up to a certain height around the side of a structural basin—as if it were a bowl half filled with water—the oil lies at the top of the water and extends around the basin in lines at the same elevation following the strike of the structure; where there is little or no water in the sands the oil accumulates in the syncline or lowest part of the oil sand.

The possibility of accurately mapping an underground sand without the use of many well records was determined only for the area investigated, for the accuracy of the results of such work depends on the degree of parallelism that exists between the different geological strata outcropping at the surface—that is, on the regularity or irregularity of the relations between the strata outcropping at the surface and the oil sands. Before wells are drilled it is, of course, impossible to map a sand, or even to say that it exists; but if in any area test wells drilled not over three to five miles apart have penetrated the same sand the high and low spots of the sand and the slopes between these spots may be mapped with an error not greater than ten or twenty feet, if the outcropping strata accurately indicate the structure.

The bulletin just published explains the methods of work and includes detailed maps of the quadrangles investigated. Copies of it may be obtained free of charge by applying to the Director of the United States Geological Survey at Washington, D. C.

VAST MINERAL WEALTH IN TURKEY.

Ernest A. Magnifico, vice consul at Smyrna, Turkey, says he believes that country the richest of its size in the world.

"There are copper mines, zinc mines, lead mines, and gold and silver mines to be found in abundance in Turkey, but they remain undeveloped because no one can get a concession from the government to work them," continued Mr. Magnifico. "Foreign capital is afraid to enter Turkey, and the industry of the country and the population, I believe, are decreasing yearly. But this cannot last forever. The people, for centuries under the yoke of restraint, are beginning to throw off their burden and are awaking to the possibilities of the future.

"Ten years ago ninety per cent. of the people were ignorant of the utility of public schools and parents were content to allow their children to grow up without education, as they had done before them. Now schools are springing up everywhere, even in the rural districts, and people are becoming alive to their true interests. They are taking an interest in politics and government affairs, and it is not a far step from education and zeal in politics to active participation in the running of the government.

"Agriculturally, Turkey is the most fertile spot in the world. Anything can be grown there. The principal products are wheat and barley, nearly all of which is shipped to England. Smyrna is a city of 400,000 population, and is the largest export city on the Mediterranean, which is saying a good deal when one remembers Genoa and Naples are on that sea. There are few manufacturing establishments there, and no machinery is used. What manufacturing is done is by hand. Smyrna rugs, of course, are famed the world over, and many people are engaged in making them."

*Besides the properties whose organization is described in this article, Cole has developed Black Mountain, a gold proposition, which he took up between the Calumet & Arizona and North Butte deals; Warren and American-Saginaw in the Bisbee district; Keweenaw and Hancock in the Michigan district, and Manhattan in the Paradise district of Arizona.

Mining News from the Many Camps

ARIZONA

Phoenix—The following table shows the gross product and assessed valuation of the producing mines in each county, the output of which is subject to taxation, with the exception of Apache and Navajo counties, which have no producing mines:

County.	Gross Product.	Assessed Valuation.
Cochise ..	25,066,166.15	6,266,541.56
	17,500.00	17,500.00
Coconino .	5,382.51	1,345.62
Gila	5,205,077.39	1,301,269.36
Graham ..	10,983,392.45	2,745,023.12
Maricopa	14,777.85	3,694.40
Mohave ..	641,710.36	160,427.58
Pima	1,501,612.54	287,902.46
Pinal	29,466.45	7,366.61
Santa Cruz	133,682.83	33,420.91
Yavapai ..	9,794,098.59	2,448,524.62
Yuma	280,023.63	70,230.91
Total ...	53,306,590.75	13,326,647.23

From the way it looks at present we will have mines right here at home before long. At any rate V. L. Mason, who lives north of town, has located a couple of claims in the Phoenix mountains, just east of Squaw Peak, which looks so good to him that he says he is willing to stake his entire capital, some $15,000, on their development.

Mason has been working his claims constantly and has quite a body of ore piled up in the arroyo, when he returned to the mine after a couple of days' absence and found that someone had stolen all his ore, his tools, provisions, and, in fact, everything but the hole, which they evidently did not consider portable.

It is reported Mason's strike has aroused intense interest among the mining men here and that many adjacent claims have been located.

Prescott—It is learned that Lawson and his associates intend to make the Humboldt smelter one of the largest in the United States, and a lead stack for the treatment of lead ores will be one of the first improvements undertaken. A big advertising campaign to dispose of the company's treasury stock will be inaugurated and the funds thus raised will not only be used for enlarging the smelter, but to develop on a mammoth scale the De Soto and the Blue Bell and the other mines for which the Arizona Consolidated Smelting Company is a holding corporation. Persons who are in a position to know state that when Lawson starts his campaign, Yavapai county will receive more advertising of its resources and its great possibilities for investment than during the entire period of its history.

In the beginning the blast furnace capacity was 10,000 tons a month, this was later increased to 15,000 tons, and now is planned to enlarge the capacity to 20,000 tons. No definite figures have ever been given out as to the value of the ore treated annually, but it is understood that it will approximate $4,000,000.

With a sack filled with rich gold ore recently taken from a shaft on his concern's properties, A. C. Kellar, general manager of the Lucky Henry Mining & Development Company, arrived in Prescott. Some of the samples were very rich in free gold, as the yellow metal appeared in specks.

The ore is a quartz porphyry, impregnated with gold streaks, the principal gold values being found in the latter samples taken from the general openings on the ground assayed from $15 to $119 in gold, some running as high as 1½ per cent in copper.

The daily ore shipments of the Canyon Copper Company to the El Paso smelters average a little less than two tons and the copper values in all ores shipped from the mine during the last five years average a little better than five per cent. The mine is located about half way down the Grand Canyon from the Grand View hotel, in one of the most picturesque places in America.

Recent developments in the Nigger Brown mine in the Black Canyon district indicate that this promising property will rank among the high grade ore producers of the country before many months.

The shaft is now down to a depth of 174 feet and in the last fifteen feet it is in a lime and porhyry contact, in which a pay streak of sulphide ore is being opened, the thickness of which has not yet been determined, and some of which carries as high as $380 in gold to the ton, with small copper values.

The Nigger Brown claim is among the oldest locations in the district, and was noted as a gold producer as far back as 1865. Caved-in works of the miners of early days are met with all through the mountains of the district, and many stone cabins with portholes, still standing, recall the time when the pioneer miner braved the dangers of the country, then infested with bloodthirsty Apaches, in search of the hidden treasures of the mountains.

The Valenciennes mine, which is reputed to have netted $40,000 in gold out of one pocket, in the later 60's, is located a short distance south of the Nigger Brown.

At an early date the air compressor plant, engine and dynamo will be installed at the Dunkirk mine, being opened by the Mount Trittle Copper Company in the State Creek district, and the building enclosing the machinery finished. Two or three power drills will be pressed into service at the mine as soon as the compressor is ready to start and the development and the running of upraises connecting the three levels pushed faster than ever.

Grading for the new concentrating plant, the machinery for which has been purchased, is now in progress, and the management expects to have it in operation about November 1st. The plant will have a capacity of thirty tons daily. It will consist of four Nissen stamps, three Wilfley concentrators, one 60-horse power boiler, 50-horse power engine, a Blake crusher, and an ore bin capacity of 100 tons.

Jerome—At the Eureka the tunnel work is progressing rapidly, and the showing of mineral is now better than ever. The workmen on this very promising property are now taking half their pay in stock at 25 cents a share. This fact alone proves that the Eureka must have all the earmarks of a future great mine. The work of running the long tunnel in the United Verde is also being rushed.

Tucson—The Pontotoc Copper Company is working thirty men and three Leyner drills sinking, and drifting at the main mine. All the work is in good sulphide ore and enough ore is being shipped to pay all development charges and the rest of the ore piled on the dumps. One hundred and seventy-seven feet of good ore has been crosscut on the 50-foot level with only the limestone hanging wall around. From the surface measurement of the croppings the foot wall is still over 200 feet from the face of the crosscut. The new double compartment shaft is all solidly timbered in the 100-foot level and a station is being cut and cross-cuts started all in better ore than is shown on the 50-foot level. A sample of the whole width and sides of the 100-foot station assayed 7.1 per cent. copper. This is a great improvement over the 50-foot level which averages about 1 per cent. copper. General Manager Burgess is making plans and estimates for a matting and concentrating plant to treat the output of the mines as the ore is an ideal smelting constituency.

At the Mineral Hill Consolidated

Copper Company's mines there are about 100 men at work at the different shafts, and it is reported that large high grade ore bodies have been opened up in the past sixty days, and from all indications there is considerable truth in this statement, for the reason that those identified with the present development are anxious to buy all the stock at a good figure.

At the Paymaster preparations are being made to put up a large concentrating plant and also a power plant for air drills, and air for underground workings. The improvement contemplated will involve an expenditure of $100,000 and will make one of the best camps in southern Arizona.

The Mineral Hill copper and gold mines are being worked by a good force of miners and are looking well. The ledge croppings in this group are large in many places being more than 100 feet in width. A hoister will be put up on this property soon and concentrating plant is one of the improvements contemplated.

Kelvin.—That the development on a huge scale of the copper deposits of Arizona is near at hand and that the region surrounding Kelvin is to be the scene of as much activity as followed the copper discoveries in and around Butte, is the firm conviction of E. W. Langley, a well-known Tonopah operator, who has lately become a resident of Los Angeles.

Representing his firm, the Langley-Trimble company, Langley came to Arizona about three months ago to personally investigate reports of great uncoverings of the green ore.

He was accompanied by an engineer and after two weeks of research near Kelvin, the fact was discovered that most of the claims were held at the modest sum of $10,000—nothing less.

At this encouragement Langley determined to send his engineer and two experienced prospectors into that field.

They located three groups of claims and obtained samples therefrom running as high as some of the richest ore yet found here.

On his return to Los Angeles last Sunday Langley found a letter from his engineer saying that the owners of the property adjoining him had offered the sum of $25,000 for one of the three groups.

Needless to say, the proposition was turned down.

"Kelvin is destined to become another Butte," said Langley in Los Angeles.

"The ore is of as high grade as any I have ever heard of and there are mountains of it there awaiting development.

"I freely confess that I had not at first an overabundance of faith, but developments have convinced me that there will be a great boom there.

"There is already much activity and as soon as I have attended to some matters here in connection with the building of my new home, I shall return to the territory for some further exploration."

Bisbee.—At the Shattuck, production is being maintained at the rate of from 350 to 400 tons per week. The ore is divided equally between the Old Dominion smelter and the Douglas smelter of the Copper Queen. On the 900-foot level the ore is showing good returns in sulphides. No change of any importance has taken place during the week in the ores from the 700 and 600 foot levels, both adding their steady quota to shipments. On the surface the new 150-horsepower boiler is now bricked in and ready for operation. The Collins compressor is being installed as rapidly as possible and will doubtless be ready for its work by September 1st.

Stockholders in North Bisbee company beyond all doubt have a right to feel encouraged by the showing of the week. The final round of shots tore down some fine specimens of sulphides which, the management states, on being assayed, averaged thirteen and one-half per cent. As yet the size of the body has not been ascertained. The strike was made in the drift eight feet off the winze sunk from the tunnel.

Florence. — Thirty-three mining claims, situated on Copper Creek, in the Table Mountain district, about ten miles north of Mammoth, this county, were sold last week to an English syndicate, headed by Engineer McKenzie of Chicago. The purchase price is $100,000, ten per cent. of which was paid in cash. The balance of the payments will be made in three installments, in six, twelve and eighteen months. Development work on these properties will be inaugurated within thirty days.

The property adjoins the Scanlon-Clark group, now operated by the Arizona and Calumet Copper Company of Bisbee, and is said to be full of promise. The Sibley company is also developing an adjoining group. This camp is full of activity and bids fair to become one of our most prosperous mining camps within a very short time.

The work of unwatering the Superior mine is progressing rapidly and the task is about accomplished. A Phelps, Dodge & Co. engineer will examine the Superior mine as soon as the Holt shaft and levels shall have been unwatered, and if he finds conditions to be what they have been reported to be it is probable that the Phelps-Dodge people will become interested in the property.

Globe.—Arrivals from Pinto Creek report very important strikes of ore in the mine of the Arizona National Copper Mining Company. The ore was encountered on the 280-foot level in the crosscut being run toward the creek, and Dr. Parker states that when he left Pinto Creek the other day the crosscut had penetrated seventeen feet of good ore carrying copper in various forms, including oxide, carbonate, native and some sulphide.

A strike of rich carbonate ore is reported to have been made recently at the bottom of the winze on the Black Oxide mine of the Superior & Boston Copper Company. The rich strata is about five inches thick and the ore assays 45 per cent. copper. The bottom of the winze is all in ore of a lower grade and on the southwest wall of the winze nearly all the way down ore is exposed from which the lowest assay obtained gives 9 per cent. copper. The southwest drift has been in from 5 to 6 per cent. ore for a distance of more than fifty feet. There are 100 tons of shipping ore on the dump, most of which was taken out in driving the drift. An ore bin is being constructed below the mouth of the tunnel and the company will soon commence shipping ore to the Old Dominion smelter.

COLORADO

CRIPPLE CREEK.

The recent strike made by Young & Crowder on the 1,100-foot level of the Isabella shaft, quite a distance from the main working shaft, is getting better as the miners get into the vein. The shoot is now about five or six feet wide and the indications are that it will be as good as the same shoot found by John Sharpe 100 feet above. Sharpe has ore that he is breaking from twelve to fifteen feet wide, and he has opened it up for over 100 feet. The company also has the same vein exactly 100 feet above, or at 900 feet, proving the vein to be at least 200 feet vertical. Mr. Sharpe is shipping over one car a day and is getting average values of two ounces, and the ore is not carefully sorted either. The company is reported to be getting slightly better values than is Mr. Sharpe.

Across five feet last night Young & Crowder obtained assays running an average of $30 in gold to the ton. It is believed that when they get in on the ore a little further the values will increase, but even with the present values they are assured a good mining proposition.

The Isabella mine is in better physical condition today than it has been in six or seven years. The company as well as all of the lessees are shipping ore, and the average value of the entire product is estimated to be $30, which, of course, does not include the big tonnage which is being run through the Isabella cyanide mill. The mill is treating about seventy-five tons daily and the company is making net from $6,000 to $7,000 per month from this concern, which is, perhaps, the most successfully operated cyanide plant in the camp. The average value of the ore being run is about $5, and there is practically an inexhaustible supply of this grade, the longevity of the mill is assured for a score of years at least. If there should not be another pound of ore discovered on this famous Bull hill property, there is plenty in sight to keep the plant running. However, during the past four months there have been three separate and distinct new finds made on the Isabella territory that compare favorably with any made this year. There is a vast territory belonging to this company that has never been exploited.

Active work will commence shortly on the Engineer claim, north of the Beacon Hill-Ajax, on which a number of Grand Rapids men have taken a five year lease with very reasonable royalty provisions. The company is putting in a plant of machinery and will sink the shaft, now 200 feet deep, an additional 200 feet before extending laterals. E. T. Britton is in charge of the work. In the early days this property produced quite heavily and is known to contain large bodies of low-grade ore which hitherto could not be treated at a profit.

The activity on Beacon hill is being contributed to by the Union Leasing Company, which is operating the Mabel M. claim of the old Gold Dollar company through the Husted shaft. Two shipments of three-ounce ore have just been sent out from the property, the ore being taken from a likely looking vein recently encountered southeast of the shaft at a depth of 300 feet.

Shipments of low grade ore to the Wishbone mill in Spring gulch were begun today by the Wishbone Mining & Milling Company, which has a lease on the Black Diamond claim on Tenderfoot hill. The company expects to send out approximately twenty tons of ore a day, which will be hauled to the mill by teams. The ore averages $10 in value.

Harry Newmeyer, a well-known baseball player of Denver, arrived here today to take charge of the properties of the Beacon Hill Consolidated Mines Company, which is financed by a group of Denver and Colorado Springs capitalists.

A shipment of ore which will run about $60 to the ton was made today by Arthur Pasto and W. O. Long, who are leasing on a block of the Gold Coin. The ore was broken from a two-foot vein, opened at a depth of 700 feet and about 150 feet east of the shaft.

One of the directors of the great Portland mine at Victor states that the production is increasing because of recent important discoveries in the twelfth level. As soon as the station now being cut at the 1,300-foot point is completed the output will be larger than ever. The company's mill at Colorado City is now handling, in addition to its own products, a certain amount from the Golden Cycle under a contract made some time ago, but it will not be long before the entire capacity of the works will be required to treat the greater output of the Portland mine. This mine is now furnishing from 225 to 250 tons a day and the total capacity is not above 300. The Golden Cycle mine, according to the last report, is still being operated on the same scale as before the destruction of its treatment plant, and a great deal of development work in blocking out new reserves is in progress.

The new cyanide mill being built for the Stratton Independence has advanced to the finishing of the foundations, and in a short time construction work on the great building will commence. The Trilby mine, on Bull hill, is in a vast body of ore, the shoot in the twelfth level measuring seven feet across and giving assays of sixteen ounces gold per ton.

That the rumor recently circulated that the El Paso mine intended to close down pending the completion of the drainage tunnel, in consequence of which there was some depression of the stock, was wholly without foundation, is indicated by the activity now being displayed on the big property. The company is working through the Beacon-Ajax shaft, two whole shifts being employed, and as much work is being done as at any time during the year.

Ore bodies opened from drifts extending from the main shaft are being actively worked now through the Beacon Hill-Ajax shaft and a considerable amount of good grade ore is being broken. All the low grade is being held in reserve pending the reopening of the Golden Cycle mill.

Henry Dahl, superintendent of the Raven Hill Ophir, belonging to Mrs. Annie Cone of Canon City, is shipping from eighteen to twenty cars of ore a month, and it is giving returns of from three to seven ounces in gold to the ton. The ore is being mined on several of the levels from 600 to 800 feet, and a considerable distance north of the shaft where the ore bodies to be found have an average width of about seven feet. There are some extremely rich streaks to be found in this mine, and occasionally a car of high grade is shipped. Mr. Dahl has on several occasions sent out carload lots which gave returns of from fifteen to twenty ounces in gold to the ton. This property is undoubtedly making more money for its owner than any in the camp.

The company as well as the lessees on the Jennie Sample, which adjoins the Ophir, are also getting out a fair tonnage that returns better than the camp's average value. The Jennie Sample company is getting the bulk of its ore from the 500-foot level, where a good-sized vein was uncovered a short time ago from which shipments are being made that give two-ounce values.

The Raven Hill Mining & Leasing Company, a Colorado Springs company operating on the 700-foot level of the Doctor-Jack Pot territory on Raven hill, is shipping from three to five cars of ore a week that give returns of about $40 in gold to the ton. The ore is now being stoped for a considerable distance, and is being broken down from three to four feet wide. This lease is looking well and the company is making some money. Smith & Altman, operating on the Elizabeth Cooper claim of the same company, are also shipping out a good tonnage that runs about $50 in gold to the ton.

DOLORES COUNTY.

The president and general manager, A. B. Roeder, and secretary-treasurer, Mark W. Potter, of the United Rico Mines Company, headed a party of New York capitalists, consisting of Messrs. Cohrer, Mack Phillips, Sullivan and others, on a visit to the property at Rico, Dolores county, a few days ago. They were met at Telluride by the local superintendent, Richard Linthicum, and M. H. Houser of Rico. These easterners are heavily interested in the United Mines properties, and it is understood extensive operations are to be carried on there without delay. The properties have been developed by three or four miles of openings and have produced four or five million dollars' worth of ore. Their values run high in silver, zinc and a fair per cent. of gold. They are great mines yet, but need improved equipment,

first class mining ability and economic operation. Dolores mountain, or Newman hill, is one of the richest upheavals in the state.

The old camps over there to be coming to the front as in the palmy days when the great Enterprise mine was pouring out tons of silver, the Black Hawk tons of lead, and dozens of other properties gold, silver, lead and zinc. Twenty years ago 1,500 miners were at work in that camp and every pocket was bulging out with money. The good old days are past, but new ones are coming in, on a broader and more substantial basis. To some extent is repeating itself, but on the better lines and under improved conditions. Capital is going in improved machinery better methods and level-headed conservatism on every mine.

A large tonnage of ore has been opened up in the Group Tunnel mine of the United Rico Company. The principal work done at this mine the last six months has been to open up and block out ore, says the Rico News. The drift on the Ute vein has been opened for 1,000 feet, many of the old raises on the vein reopened and new ones driven, which has blocked out an immense tonnage of both shipping and high-grade milling ore. Over 5,000 feet of drifts and crosscuts have been cut, tracked, timbered and new shoots built, making available a great part of the large mass of milling stuff stored in the stopes all through the workings. Work has again started on the Powder House vein by a raise near the Group Tunnel level. This is one of the large fissures cut by the tunnel a short distance from its portal in the early days of development, and no further work was done from this point until recently.

GUNNISON COUNTY.

Recent reports from Irwin, a mining town near Crested Butte, in speaking of the Forest Queen mine says it was years ago one of the richest producers in Gunnison county. R. W. Woodbury, B. F. Woodbury, and several other Denver men put a good deal of money into it and for a time received very substantial returns. But as the workings deepened there was a slip or fault which broke the vein. Good engineering in the course of time found the continuation, since when it has undergone a number of changes in ownership and development. At the present time a concentrating plant capable of treating the large output is being installed, together with many other improvements. Late reports from Irwin say the management should be able to ship from fifty to 100 tons of concentrates daily after the mill gets into perfect running order, and that this mine together with the Ruby Chief and one or two others, should send 150 tons to the smelters every day.

The Erie mine at White Pine is producing excellent shipping ore from a strong vein. The Gunnison Republican says the Elk mountains, north of Crested Butte and Gothic, are being developed steadily for a heavy output of ore. These mines are capable of yielding 500 tons daily, and the Taylor river and Italian mountain districts ought to contribute upwards of 200 tons a day. It will be a glad time for the smelting industry when the mines mentioned reach the stage which the Republican considers an immediate possibility, but before that day arrives a lot of things will have to be done—the building of branch railroads for one thing and iron mills for another. The ore is there, no doubt, but the requisite facilities for getting it to market are wanting.

The Pilot states that it understood the Blain and Alice properties near Gothic, owned by Judge Dissette of Cleveland, and Captain McLeod of Gothic, are to receive extensive development, and a mill and compressor plant are in contemplation. A wagon road is now being constructed from Gothic to the mine, a distance of one and one-half miles. The two properties above named have had quite an amount of development, and some very good shipments have been made from the mines. During the past winter a force of men was employed on the properties and several fine lead-silver ore shoots were opened up, from which quite an amount was taken and is piled up on the dumps awaiting shipment to the mill or smelter. The owners are considering the advisability of driving a lower tunnel by which it is expected the ore encountered in the present workings of the mine may be opened some 300 feet lower down on their dip into the mountain which will give about 500 feet of stoping ground from this level to the surface outcrop of the veins.

The advisability of putting in a suitable milling plant for the concentration of the ores is also before the owners of the property, and it is thought that the power can be supplied to operate the entire system, for lighting, mining and milling, from the mountain streams which flow past the mines where a head of from one to five hundred feet may be obtained and capable of generating 500 horse power. This power is to be obtained through Pelton water wheels and converted into electric energy by powerful dynamos and the same transmitted over copper cables to the mill and compressor plants, no matter where they are located, at the mine or the foot of the mountain; in the latter case, the ores are to be delivered to the mills, down inclines by wire rope tramways, at an expense of a few cents per ton. An electrical engineer will be called to locate a site, measure the water flow and decide upon the necessary fall required to develop sufficient power to drive all the machinery and to operate both plants when installed. The advisability of using a diamond drill for definitely locating the ore bodies in the mines has been taken into consideration. This might save expensive tunneling in barren territory as all the drifts would be headed toward the ore deposits if their location was definitely determined beforehand.

Irwin, Gothic and other camps in that part of Gunnison county appear to be attracting far more attention than any corresponding period in the past fifteen years has shown.

A strike of considerable importance has been made, it is rumored, near Gothic in a re-location of an old abandoned mine. The ore, says the Pilot, was found to run over 100 ounces in silver and a handsome per cent. of copper to the ton. There are doubtless many such opportunities to go into old prospect holes which have lain idle for the last quarter of a century and find pay ore in them, as when they were originally located nothing under two or three hundred ounces in silver per ton could be worked at a profit and copper was worthless then and zinc detriment to any mine; while lead would not pay the transportation costs. The greatest drawback we can see to the mine prospector at the present time, is that they have all left the country and those who have not are ready to do so and go to Nevada, Canada or some other part of the country.

LA PLATA COUNTY.

Reports have just reached this office of a great strike in the Small Hopes mine, located in the La Plata mountains. The property is owned by New York and Pennsylvania capitalists, and a selected ton of ore gave a gross return, it is reported, of $360,000, chiefly in gold. A second shipment returned over $62,000 to the ton.

If these reports are reliable, the La Plata district is beginning to show what it is made for. The Small Hopes people have been keeping these phenomenal shipments quiet as long as possible, that they might pick up all the adjoining properties they wanted.

The Idaho is another boomer, and has struck it richer than Croesus. The Prince is a steady shipper of fair grade gold and copper ore and the property

is improving rapidly with development.

Within the last ten days a small streak of smelting iron has been exposed in the Kennedy mine, and average samples gave values of $2,100 to the ton.

The May Day, owned by A. E. Reynolds and others of Denver, and Mayor C. E. McConnell of Durango, has become one of the great mines of the La Plata mountains, and others over there are coming to the front with commendable strides.

That section of the state underwent considerable development about twenty years ago, but for fifteen years of the intervening time very little work was done in the district. Two years ago a number of experienced mining men became convinced that the district had a great future, and, going quietly to work, they have constantly increased the scope of their operations until today those experts who have been fortunate enough to learn of the extraordinary finds already prophesy that it is soon to be known as one of the really great camps of the state.

The Oro Fino district, also in the La Plata mountains, fourteen miles from Durango, and directly north of the May Day and the other properties which have been doing so remarkably of late, is also regarded by experts as a locality with a great future. For the last five weeks the pumps have been at work night and day in the Neglected property and nothing is being left undone to hasten the unwatering of the shaft. About five years ago remarkably rich ore was found in several levels of this property, but owing to trouble among the stockholders in the company, work was stopped very soon after the discovery. The parties now engaged in reopening the mine intend to make extensive developments along strictly conservative lines, and among mining men throughout the San Juan country the property is expected to become a heavy producer.

ROUTT COUNTY.

Officials of the Moffat road state that in all probability that road will be completed to Steamboat Springs in the next twelve or fifteen months. General Manager Duel was positive that the road would be completed to that point by early fall next year. Nothing will stop the progress of the line but a financial panic, labor disruptions or other serious business disturbances. Mr. Duel advises the people of Routt county to push ahead, develop their resources, establish their colonies, open their farms and mines and the road will take care of their products.

Routt county is as big as an empire and its resources are comparatively unlimited. Vast water powers, timber, immense grazing ranges, extensive coal areas, gold, silver, copper, lead, zinc, iron and other metalliferous values abound in all parts of the county. It is a marvelous region of undeveloped resources.

Manager Duel says all the work in the Egeria canon will be finished within the next six months. The grading in Gore canon is practically completed and he is emphatic in his statement that track-laying in the canon will begin in August. From Egeria canon to Steamboat Springs the work of grading will be light, as there are few obstacles to be overcome.

A great many prospectors are flocking to the Gore range, under an excitement caused by the discovery of a piece of very rich gold ore recently by John Nelson of Middle Park. It was found in the slate and sandstone formation above the Henry Beeker ranch, on the eastern side of the Gore. The fragment is said to be literally covered with fine and coarse gold. The men now exploring that section are endeavoring to locate the vein from which it was eroded, but at last accounts had not discovered it. The Sentinel says some excellent ore is being mined in the Three Forks district, on the border line of Colorado and Wyoming by the Snake River Consolidated Mining Company. The samples tested average over $47 per ton.

"No event, to my mind, in recent years, with the exception of the construction of the Moffat road, will add more to Denver's permanence as the central point of this great Western empire, or do more to bring true conditions in Routt county to the notice of the world at large and homeseekers in particular, than will the opening of the Little Snake River valley to settlement, which will be done next month by the State Land Board.

This is the way Jarvis Richards of Denver, one of the leading stockmen and capitalist of the West, a brother of former Governor De Forest Richards of Wyoming, comments on the results of a trip to the new district which is soon to be added to Colorado's galaxy of agricultural stars. Mr. Richards has just returned from an extended visit to the valley in company with C. G. Cunningham, a prominent Omaha capitalist, and C. E. Wantland, vice president and general manager of the Routt County Development Company, which company is building the canal system to irrigate the valley. Mr. Richards, by reason of his heavy interests in various parts of the West, and his familiarity with conditions as to soil, climate, markets, etc., is competent to pass on the merits of any district.

"I was much impressed, for one thing, with the soil," said Mr. Richards. "It is neither too sandy not too stiff, just about the right proportion to hold seed well, to carry water, and yet stiff enough so that it is not too porous. It is very mellow and rich, and as was evident from the farms we saw under small ditches, will raise anything that is raised elsewhere in Colorado. The district is bound to be a heavy producer of all grains and grasses, especially wheat and oats. The climate is beautiful, as in other parts of Colorado.

People are coming from all parts of the country to look over the land and to work on the canal system, and as a result renewed attention is being directed to other resources of the county, and coincident with the settlement of the Little Snake River valley, the coal mines, placer beds and other mineral features of the northwestern part of the county will have their share of attention.

"This will be of material assistance to Mr. Moffat and his associates in their arrangements for the Moffat road, and also will draw attention of other railroad companies to the valley. Where there are many settlers railroads soon find them, and it is already reported that the Union Pacific plans an extension into Routt county from either Bitter creek or Wamsutter. In fact, someone was making a reconnoissance of the Bitter creek route while we were in the valley."

It is reported that the Blevens placer, known as the Jack Rabbit field, in Routt county, has been sold to Dr. C. J. Decker, physician and surgeon assigned to the United States warship Alabama, on a report made for him by Col. W. C. Fitzsimmons, a distinguished mining engineer. The Craig Courier states that the dredge now on the ground will be remodeled by adding patent riffles and extending them to the end of the tail chute. The most important change in the operation of the mine, however, will be the addition of a mill to treat the black sand, which is said to contain values equal to those extracted in the regular course of working. The new owner will expend something like $50,000 in putting these placers in shape for extensive operation. Two experienced dredge men will come from California to work the dredge boat.

NEVADA

Judge George P. Costigan of Denver, has just returned from some of the live camps of Nevada, where he has become interested. A dozen or fifteen years ago Judge Costigan made a fortune in the famous Tomboy deal, be-

fore it became one of the richest gold mines in the world. He went into a new district on the California and Nevada line, and after a careful investigation is positive it will prove to be a rich producer of high-grade gold ores. The locality has been christened the Sunny Jim mining district and lies in the southern part of Esmeralda county, Nevada, about sixty miles inland from the terminus of the Virginia-Truckee railroad and fully 100 miles from Goldfield. Ledges outcropping strongly were discovered there about two months ago. The mountains are quite elevated and well adapted to mining by tunnels. Judge Costigan states that there are thirty to forty Colorado miners there prospecting and opening veins, and it is practically a Colorado district. It is a very interesting country, with abundance of timber and a great flow of water in the Walker river, a large stream one and a half miles from the camp that carries 3,000 inches at its lowest stage, therefore capable of developing any amount of electric power for all purposes when required.

George P. and Edward P. Costigan, his son, have organized a close corporation in Denver, under the name of the Sonoma-Nevada Mines Company, and are now engaged in opening the veins they have acquired. There is no stock promotion in it and no advertising has been done. The veins average from two to twenty feet in width, the mineral being readily amenable to cyanidation. The croppings assay from $2 to $7 gold per ton, but it is now well ascertained that richer products will be found below. This conclusion is based upon the fact that in the Pittsburg mine in Masonic district, immediately adjoining, where the same surface conditions prevail, the operators have recently uncovered a very rich vein from which forty tons were shipped that ran about $1,000 per ton. This property has a strong shoot of high-grade with a large body of low-grade cyaniding stuff. Nixon and Wingfield of the famous Mohawk at Goldfield have an option on the Pittsburg and a cyanide plant will soon be erected there. The formation is andesite, with quartz-porphyry vein fillings, capped with quartzite.

Until within the last sixty days no work had been done in the Sunny Jim district and none in the neighborhood except on the Pittsburg and it was the recent finding of extraordinary values in the latter which led to a rush of prospectors in that direction. Judge Costigan will return to his property September 1st and remain all winter. As soon as the mines are sufficiently developed to warrant it, a cyanide plant will be built to work the lower grade products.

Dr. Waxham of this city has recently organized a company of Denver men which has taken over a number of claims in the same district and will open them during the fall and winter.

Judge Costigan says Nevada is overflowing with people from all parts of the world. One reason good miners are scarce in the older camps is because thousands of them have drifted into Nevada, Idaho, Washington, Alaska, British Columbia and other parts of the northwest, where they find work at good wages. The great Northwest is settling up rapidly, and men and money are pouring into that vast region like a deluge. Farseeing men are just beginning to comprehend its marvelous resources.

MEXICO

President Diaz of Mexico, in his recent message to the Mexican congress, stated that the currency situation in the Republic has greatly improved in the last two years. The coinage of gold has reached almost $60,000,000 in 5 and 10-peso pieces, as against $42,000,000 last September. The coinage of subsidiary silver now amounts to $22,000,000, of which a considerable part represents the result of the reminting of more than $7,000,000 of old coins. During the next few weeks, it is hoped, the supply of subsidiary coins will be sufficient to meet the demand which has been increased by the exports of hard pesos.

WYOMING

William Atchison, a prominent ranchman from Gray Rock on the Laramie river, Wyoming states that a large number of Union Pacific surveyors are working up the Laramie river and have orders to find the most direct route westward. These surveys are for the extension of the North Platte valley branch of the Union Pacific and from the lines being run it is believed that the road will branch off at Fort Laramie, leaving the Platte and going up the Laramie river valley, probably passing north of Uva and crossing the mountains west of that place to a connection with the main line near Rock River or Lookout.

Professor Nicholson of the Minnesota School of Mines recently discovered a large deposit of monazite sands in the streams and gulches in the Miners' Delight, Atlantic City, South Pass and Lewiston districts near Lander. Monazite is used in the manufacture of mantels and is worth $6 per pound. Quantities of other rare metals have also been found in the sands.

The completion of the Saratoga and Encampment railroad will be celebrated at the former place, August 28th-29th, and a large attendance is expected from all parts of the state and from Colorado. The guests will be feasted on trout, as the citizens are preparing for an elaborate trout bake. It will be a great event in the history of the thrifty town on the North Platte.

In prospecting, says an old time prospector from Mexico, the horn spoon is preferable to the gold pan, or batea, because it is more convenient to carry (it can go in a pocket) and in use it requires very little water, and does not fatigue the user by causing prolonged stooping. A small bottle of quicksilver will be found useful when testing for gold in a very fine state. A small bar magnet is serviceable in cleaning up pannings. A frying pan, tin dish or any other receptacle will answer the purpose of a goldpan.

The New York Herald states that diamonds "in place," or in their original geological setting, and of such fine quality and in such quantity as to give pomise of a rich mine, have been found in Pike county, Arkansas. Such was the statement made by Dr. George F. Kunz of New York, a noted gem expert. That the diamond existed has been kept as secret as possible by the owners since they were assured by experts that their ground carried the gems.

In a government report to be made public soon, the first official notice is to be given that a diamond mine has been found in the United States. This bulletin, which will prove sensational, despite the conservatism with which it has been prepared, embodies the result of investigations by Dr. Kunz and Dr. Henry S. Washington, a noted petrographer. Dr. Kunz has studied and endeavored to trace to their supposed sources every diamond found in the United States in the last twenty years.

Arkansas diamonds are found over an area of 100 acres near the small town of Nashville, about sixty miles from Little Rock. They occur in a volcanic rock similar to that of the South African mines. The first two stones were found August 1, 1906, by an Arkansan. Since then they have been found almost continuously, the total number being 120 at last report. Many stones are white and of good water, while some are yellow and others of brown boart. The two largest stones weigh six and one-half carats, one being exceedingly fine white and the other brown.

No diamonds have been discovered outside the 100-acre area. They were all found between the two dikes where a roadway has cut up the decomposed rock wthin an area of some five acres.

Dr. Kunz says: "In my opinion a genuine, permanent diamond mine has been found and Americans may soon be wearing American diamonds."

PERSONALS

S. O. Carey, manager of the Salida Smelting Company, Salida, Colo., is visiting Utah camps.

William M. Cooper, manager of the Capital Prize Mining Company has returned to Georgetown, Colorado, from a visitor in eastern cities.

Philip Argall of Denver has been elected a member of the Chemical, Metallurgical and Mining Society of South Africa.

C. E. Singer, formerly of Colorado, has accepted a position as chemist with the Compania Metallurgica Mexicana, in San Luis Potosi, Mexico.

R. W. Brock of the Canadian Geological Survey has completed an inspection of the Cobalt and Larder Lake sections of Ontario and has returned to British Columbia.

R. B. Watson of New York and William Watson, formerly of Johannesburg, South Africa, have opened offices at 25 Broad street, New York, and will engage in mine examinations.

G. A. Overstorm, expert in mill construction and professor of mining in the Utah State University, has returned to Salt Lake from Mexico, where he has spent the past two months on professional business.

W. R. Kramer, a well known business man of Ouray, was in Denver a few days last week. He reports mining over there in good shape and all branches of business prosperous. The entire San Juan never looked into the future with brighter promise.

J. O. Campbell, for several years ore purchasing agent for the American Smelting & Refining Company, and more recently manager of the Aspen and other mines near Silverton, has been granted an extended leave of absence to recuperate his failing health. Moritz Stockder will succeed Mr. Campbell as manager of the Aspen. He has the reputation of being a very competent man.

David Swickhimer, who owns extensive mining interests at Rico, Dolores county, was in the city several days this week on business in connection with his mines. He says the mining interests of Dolores county are looking very bright. Several strong companies are taking hold over there, and development, output and improvements are steadily increasing. Good miners are in demand, mechanics and other skilled labor.

Dr. E. Nelson, Dr. C. F. Swan and R. S. Lindstrom, all of Chicago, were in the city last week, on their way home from Turret, Chaffee county, where they own valuable mining interests. The annual stockholders' meeting was held in Colorado Springs, at which Dr. A. Ackinson was elected president; L. S. Atkins, vice president; P. C. Pearson, secretary; C. A. Valentine, treasurer; J. A. Dansier, attorney; Charles J. Anderson, manager, and John Sands, superintendent. Doctors Swan and Nelson and Mr. Valentine were elected a board of managers. These gentlemen appeared to be well pleased with their Turret properties and will push development and equipment as rapidly as possible.

OBITUARY

J. A Sill, one of the most prominent mining brokers of the state, died at his home in Colorado Springs last week of cancer of the stomach. He was fifty-nine years of age, and is survived by two sons and a daughter.

Mr. Sill was formerly president of the Union Gold Mining Company of Cripple Creek, which sold its control to the late W. S. Stratton, and was prominently identified with many Cripple Creek ventures.

George Holgar, a German miner, was electrocuted in the Smuggler mine near Telluride last week.

He was on an ore car going to his work in level No. 9, when he slipped, and to avoid falling threw his arm over the power trolley, the shock killing him instantly, the voltage being very powerful. Deceased was an old-time miner, with no known relatives in this country, all his people supposed to be in Germany.

Robert A. Pinkerton, the noted detective, died at sea last week while on his way to Germany for his health. He was a son of Major Allan Pinkerton, the founder of the famous Pinkerton detective association that has become noted all over the world. He was fifty-six years of age and one of the most famous rogue catchers this, or any other country, ever produced.

He was well known in Denver and has several relatives here. Major Allan Pinkerton, the father died in 1884.

Robert's son, Allan Pinkerton, now thirty years of age, will take up his father's work and become a member of the famous association.

Thomas T. Hughes, president of the Colorado Lead Works, and Kendrick Hughes, 735 Fourteenth avenue, this city, are brothers of Mrs. Robert Pinkerton. Mrs. Pinkerton was in Bay Shore, Long Island, when the sad news reached her. Mrs. Jay Carlile, a daughter, was on her way home from a three months' honeymoon trip with her husband in Europe and unknowingly passed her father in mid-ocean. The remains will be returned to Chicago where the interment will take place.

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This great Pinkerton system employes more than 1,000 men, has branch agencies in all the important cities of the United States and has 100,000 Bertillon measurements of criminals on file in the Harrison street police station, Chicago. During the existence of the great institution it has recovered and restored to its owners money and other valuables aggregating more than $50,000,000. By reason of their occupation the Pinkertons made many enemies, but only among evil-doers or their friends. As criminal catchers they have a world-wide reputation which dates back to the War of the Rebellion in the early sixties.

Charles L. Hall a Colorado pioneer, died at the home of his daughter, Mrs. Minnie Hall-Perry, in this city, Friday evening, August 16th. He was naturally of a robust physique and had been ailing but two or three weeks. Mr. Hall was born in Sherman, New York, in 1835, and came to Colorado in 1859. In 1861, while prospecting with the Jim Baker expedition in the San Juan, near where Silverton now stands, he nearly lost his life, but was finally rescued by former Governor Eaton, who was freighting in that part of the territory. When found Charlie was blind, and had prepared to die, not expecting to be rescued. Himself and two companions had been without food for nearly two weeks, and the intense cold and fearful storms of that desolate region added greatly to his sufferings. They had become separated

(Continued on Page 31.)

THE STOCK AND METAL MARKETS

Colorado Springs

Aug. 21.—Stocks opened up the week with Fanny Rawlings advancing to 6¾c bid, 8c asked without sale. Portland was as low as $1 bid. Tuesday El Paso sold between 36½c and 37c, with Fanny Rawlings ½c higher at 7c. Wednesday stocks were weak and very little trading. Quotations as follows:

Mines.

Stock.	Bid.
Acacia	05¾
C. C. Cons.	04⅞
Dante	04¾
Doctor-Jack Pot	05
Elkton	45½
El Paso	36⅞
Fanny Rawlings	05
Gold Dollar	06
Gold Sovereign	03⅞
Isabella	20½
Jack Pot	04½
Last Dollar	02
Lexington	02½
Mary Cashen	01
Mary McKinney	38
Moon Anchor	02
Old Gold	03
Pharmacist	03⅞
Portland	100
Vindicator	75
Work	16¼

Unlisted.

Stock.	Bid.
Jenny Sample	04½
Jerry Johnson	04¾
United Gold Mines.	05

Prospects.

American Con.	007
Banner	01
Bob Lee	007
Buckhorn	0065
Jolly Jane	0075
Keystone	0085
Little Puck	01¼
Mary Nevin	01⅝
Mt. Beauty	06
Pilgrim	007
Raven	01
Republic	007
Requa Savage	03
Rose Maud	01⅝
Rose Nicol	01
St. Thomas	01

Miscellaneous.

Stock.	Bid.
Anchor	003
Blanche	003
Cable	005
Easter Bell	002
Flower of the West	007
Gold Hill	002
Grace	002
Hummer	003
Lucrative	005
Matoa	005
Marquette	002
Missouri	005
Montreal	005
National	008
Nellie V.	0045
Tenderfoot	003
Texas Girl	0035
Uncle Sam	003
Volcano	002

Denver

Aug. 21.—The following were the quotations and sales on the Denver Mining Stock exchange:

Stock.	Bid.
Acacia	06
C. C. Con.	04¾
Dante	05
Gold	06⅛

New York

Aug. 21.—The leading copper stocks have suffered severely in the general downward movement which the market has been taking, part of their decline being attributable to the fear of cheaper copper in the near future and other bear influence which might have affected these stocks unfavorably even in a rising market. The three most active coppers, Amalgamated, Anaconda and Tennessee, have all fallen uniformly, with the first named suffering a somewhat greater loss than its companions.

Amalgamated reached its highest point thus far in 1907 on January 5th, when it sold at 121⅞. Its new low record, made Thursday morning, is 65, or a loss from the high of 56⅞. This is a decline of 46 per cent. and represents a depreciation among the 1,538,879 outstanding shares of $87,516,048. With its eight per cent. dividend, a purchase at 65 would net 12.3 per cent.

Anaconda fell to 42 Thursday morning after selling at its best period this year on February 16, at 75⅝, a drop of 33⅝ points. On its 1,200,000 shares, this shrinkage would amount to $40,344,000, or 44 per cent. Anaconda stock bought at the lowest and receiving the present dividend rate of $7 a share, would net the buyer 16.6 per cent. on his investment.

Tennessee Copper sold at 53½ on March 1st and at 30 at one time Thursday. This decline of 23½ points means a depreciation of $4,700,000 among the 200,000 outstanding shares. At the low price, an investment in this stock, supposing the last dividends at $1.25 semi-annually to be continued, would pay 8.3 per cent.

Waterbury, Conn.—The copper situation has changed very little, the drop in the price having unsettled the market and held up orders. The best information is that the customers of the brass mills are busy, the season of the year being taken into consideration, and would soon order, but for the uncertainty of the price of copper. Apparently all that holds up orders, checking the continuance of strong business, is this uncertainty.

The general understanding here is that the American Brass Company, like other rolling mills, found itself, after the drop in copper and the resultant uncertainty, with more copper on hand than had been expected.

Total supplies of copper in Europe during the month of July amounted to 31,738 tons. This amount is greater than any single month's movement except December, 1906, when the total was 33,584 tons, since October, 1904; that month's figures was 33,155 tons.

The total July movement was in direct contrast with that of the preceding month, for June's figures, practically without exception were the smallest for about three years.

One feature of the European copper trade in the month just ended was the complete absence of shipments of standard copper from Liverpool and Swansea warehouses to America, thus marking the apparent culmination—for the time being, at least—of the purchase of copper warrants in London by American speculative interests who, some time ago, found a profit in buying cheap trade copper abroad and importing it to the United States, having it refined and sold. In the twelve months ended June 30, there had been shipped to the United States 4,500 tons of Standards against 2,775 tons the previous year and 300 tons two years ago.

Supplies at the ports of London, Liverpool, Swansea and Havre in July increased more than 50 per cent. over the previous month, or from 2,548 tons to 4,358 tons; other European ports showed the same percentage of increase, or from 8,831 tons to 13,725 tons. Shipments from Chili to the United States and Europe gained almost 100 per cent.—from 1,600 tons in June to 3,000 tons in the following month. Australian shipments to Europe, on the other hand, dropped from 3 750 tons to 3,400 tons. A gain of almost 10,000 tons was made in the amount of deliveries, from 21,904 tons to 31,129 tons.

The following table shows a two years' comparison of the movement of copper abroad (in tons) as recorded on July 31 in each instance:

	1907.	1906.
Stks. Eng. & France..	12,907	12,628
Total supplies	31,738	27,387
Sup. f'm N. Amer.....	18,083	16,890
Year's supplies 331,292		329,330
*Year's deliveries 326,513		331,368

*Excluding shipments of Standars to America.

Following are the quotations:

Stock.	Bid.
Amalgamated Copper	68¾
Am. Car & Foundry	37¼
American Smelting	94⅜
Do preferred	95¼
Colo. Fuel & Iron.....	23¾

Mining Stock Exchange.

Stock.	Bid.
Ahmeek	....
Black Mountain	04
Cumberland Ely	07
Davis-Daly	09¼
East Butte	06¼
Furnace Creek	....
Greene Cananea Copper	12
Globe Cons. Copper	11
Nevada Cons.	10⅜
Nipissing	07½
Superior & Pittsburg	14⅜
United Rico	50
Butte & London	01¼

Boston

Aug. 21.—A Sears building copper interest, recently returned from a week's visit at the Lake, says:

"Contrary to the usual state of affairs, I found very little of striking interest during my recent trip. There is at the Lake mines a very great scarcity of both skilled and unskilled labor, however, and 30 per cent. more men could be employed were they to be had. Notwithstanding the prevailing unsettlement in the metal market there is no disposition to curtail operations or reduce the output, and this notwithstanding there is on the docks in the copper country between 15,000,000 and 18,000,000 pounds of accumulated copper.

"The banks are in general overloaned and there is no present disposition to loan more even on the high priced coppers. As usual there are many men to be found who are carrying copper stocks which show them an enormous shrinkage. Many of the western banks have had their money loaned on six months' time in the eastern markets at high rates, these notes are now maturing and the west is calling for its funds. This has been a most important factor contributing to the present stringency in the east.

"As to copper little can be said. I have recently seen the largest interests in the trade and they are, one and all, hopelessly at sea. I do not think any of the large selling interests have materially reduced their quotations, for it would be useless to do so. The smaller concerns have been cutting prices. You never can find a copper buyer by continuing to make concessions; that goes without saying, although some foolish attempts have recently been made to attract business in this way.

"I have heard well substantiated reports that the General Electric Company, finding that some of their orders calling for copper consumption had been cancelled, sought to resell some of their raw copper supplies, but I imagine without success. This would have been good business provided, of course, one could find a buyer.

"I have been in conference recently with some of the important financial interests in New York, and I do not believe they are disposed to do anything more in the present stock market situation than to prevent failures. To refuse to give needed assistance at the last critical moment would, of course, only react on themselves, as they are shareholders in banks, and they must sooner or later act for their own preservation."

Following are the quotations:

Stock.	Bid.
Adventure	02½
Arcadian	05
Allouez	33
Atlantic	10½
Bingham	11⅞
Boston Con.	18½
Balakala	07⅞
Butte Coalition	19
Calumet & Hecla	....
Calumet & Arizona 150	
Centennial	20½
Copper Range	63
Daly West	13⅜
Franklin	10
Granby	98
Isle Royale	15
La Salle	11¼
Mass	04¾
Mohawk	66
North Butte	64
Old Dominion	29½
Osceola 102	
Parrot	14½
Quincy	94
Shannon	13
Tamarack	80
Trinity	16½
United Copper	52½
United States Smelting	38¾
Do preferred	39
Utah Cons.	38½
Victoria	05½
Winona	05
Wyandotte	75
Wolverine 140	

Nevada

San Francisco, Cal., Aug. 22.—Closing quotations on the Mining Exchange August 22:

(Received over private wire of O. L. Malo & Co., 221-222 Boston Block, Denver.)

Tonopah.

Stock.	Bid.
Tonopah Nevada	....
Montana Tonopah $2.95	
Tonopah Extension	1.25
MacNamara	22
Midway	70
Tonopah Belmont	2.90
Tonopah North Star	18
Ohio Tonopah	2
West End Cons.	62
Rescue	12
Golden Anchor	12
Jim Butler	87
Cash Boy	4
Home	....
Boston Tonopah	....
Monarch Pittsburg Ext.	6
Montana Milday Ext.	....
Golden Crown	6

Goldfield.

Stock.	Bid.
Sandstorm	....
Red Top	....
Mohawk 18.00	
Columbia Mountain	....
Jumbo	....
Jumbo Ext.	1.75
Vernal	15
Pennsylvania	....
Kendall	23
Booth	....
Blue Bull	32
Adams	14
Silver Pick	55
May Queen	13
Nevada Boy	7
Black Butte Ext.	7
Blue Bell	17
Dixie	7
Goldfield Columbia	....
Hibernia	8
St. Ives	88
Lone Star	21
Potlatch	....
Oro	20
Mayne	6
Atlanta	51
Great Bend	65
Simmerone	....
Empire	10
Red Top Ext.	26
Florence	4.52½
Diamondfield B. B. Cons.....	26
Goldfield Daisy	1.50
Laguna	....
Commonwealth	25
Combination Fraction	2.12½
Great Bend Ext.	14
Great Bend Annex	8
Milltown	25
Black Butte Bonanza	6
Kewanos	....
Esmeralda	....
Portland	20
Crackerjack	20
Francis Mohawk	1.15
Red Hills	52
Mohawk Extension	10
Lou Dillon	8

Yellow Tiger	20
Grandma	19
Silver Pick Ext.	3
Yellow Rose	7
Goldfield Cons.	7.52½

Bullfrog.

Stock.	Bid.
Original	6
Bullfrog Mining	....
National Bank	19
Amethyst	....
Gold Bar	58
Denver Bullfrog Annex	....
Bonnie Clare	....
Mayflower Cons.	34
Montgom'y-Shoshone Ext.	7
Montgomery Mt.	10
Nugget	4
Tramp Cons.	32
Victor	....
North Star	3

Manhattan.

Stock.	Bid.
Manhattan Cons.	40
Manhattan Mining Co.	6
Gold Wedge	6
Seyler Humphrey	5
Dexter	12
Crescent	....
Combination	2
Granny	24
Original Manhattan	....
Broncho	8
Jumping Jack	....
Stray Dog	16
Indian Camp	6

Other Districts.

Stock.	Bid.
Fairview Silver King	....
Fairview Eagle	1.52½
Nevada Hills	....
Pittsburg Silver Peak	1.52½
North Star Wonder	....
Eagles Nest	33
Ruby Wonder	....
Alice of Wonder	3
Ft Red Rosa	....

Metals

August 22.

Bar silver	67⅞
Lead	$ 4.95
Spelter	5.50
Copper	18.50

JULY COPPER PRODUCTION.

Boston.—The Boston News Bureau figures the production of copper in the United States, Mexico and Canada for the month of July at 98,623,870 pounds, compared with a production of 96,123,030 pounds in June, 1907, and 99,276,970 pounds in July, 1906, a decrease of 853,100 pounds compared with last year.

It appears to be a physical impossibility for the producers of copper to increase their production over last year. One district will increase one month and another district will fall behind. Utah was the bright particular star in increasing production last month, the output from its smelters aggregating in excess of 10,000,000 pounds. Some of this production, however, came from California and Nevada ores. On the other hand Butte production fell off nearly 6,000,000 pounds and Arizona production fell off about 2,000,000 pounds. Canadian production was larger during July than any other month this year.

The total production of the United States, Mexico and Canada for the first seven months of the year is estimated and compared as follows:

	1907.	1906.	Inc.	Dec.
First six months	563,909,263	586,494,581	.....	22,585,318
July	98,423,870	99,276,970	.....	853,100
Total	662,333,133	685,771,551	.....	23,438,418

POSSIBLE GOLD EXPORT TO EGYPT.

The need of gold for Egypt is disturbing European financiers. The Continental banks, as a general rule, like the National Bank of Egypt, are required to hold a gold reserve of 50 per cent. against their notes of issue. If, therefore, a million dollars in coin is withdrawn, the bank must, simultaneously, withdraw two million in notes, which represents a corresponding contraction in loans outstanding against the notes.

In view of the rate of exchange in Egypt against Europe, it is reported that inquiries have been made here looking to a possible shipment of gold coin, direct to Alexandria, next Saturday. Unsatisfactory as it certainly would be to see gold leaving New York for any point, it might be better than a repetition of what took place last October; with a loan from the Bank of France to protect the Bank of England, coinciding with a rise in its own discount rate to six per cent. This resulted from the withdrawal of 4,500,000 which might have left notes of a corresponding amount uncovered.

A shipment of twenty dollar gold pieces would, it is estimated have a margin in profit over freight, insurance and interest, if sold to arrive at 77s. 4d.

NIPISSING.

Boston.—It was recently stated that Nipissing Bonanza vein 49 was found barren where penetrated on the 100-foot level by the crosscut from the shaft.

General Manager Drummond now informs the management that in a raise from 100-foot level, 18 feet below the level at which he is now stoping, or 41 feet below the level of the old open cut, the vein was cut and consisted of three inches of calcite and three inches of clay gouge. The assays are very low grade. It is planned to raise to connect with the stope and then drift on the vein at the lowest point where the ore is found to be profitable.

The appearance of the vein at this point is rather discouraging in view of the large amount of development work which had been planned from this shaft.

The most promising development in the Nipissing is the Kendall vein. The shaft on this vein is down thirty-seven feet and has at the bottom a four inch vein of 3,500 ounces ore. The vein is as strong at this point as on the surface.

Of the total of $1,137,000 of ore in the Nipissing available for extraction of date Aug. 1, $405,000 is in the Kendall ledge or twice the amount of ore in any other portion of the property.

The Nipissing Company now has 325 men at work, of whom 121 are connected with mining, 140 with prospecting, the remainder being mechanics and general laborers, etc.

ARIZONA COPPER.

Edinburgh — The Arizona Copper Company reports for the half-year ended March 31, surplus after preference dividends, but subject to capital expenditure, debt redemption and contingencies, of £235,913, total surplus being £247,421. The directors propose interim dividends of 2s. 3d. on the preferred and deferred ordinary shares, leaving surplus of £76,433.

During the half-year operations were suspended nearly a month, owing to floods, the damage expenditures exceeding £30,000, besides much larger indirect loss. Liability has been denied by the neighboring company, whose dam burst during the flood, and the Arizona company may have to take its damage claim to court.

REPORTS ON HANSON CONSOLIDATED.

F. R. Weekes, the mining engineer, who for three years was with the Guggenheims, has made an inspection of the properties of the Hanson Consolidated Silver Mines in Canada. He estimates that 962,500 tons of rich ore will be taken from two veins in shaft No. 2.

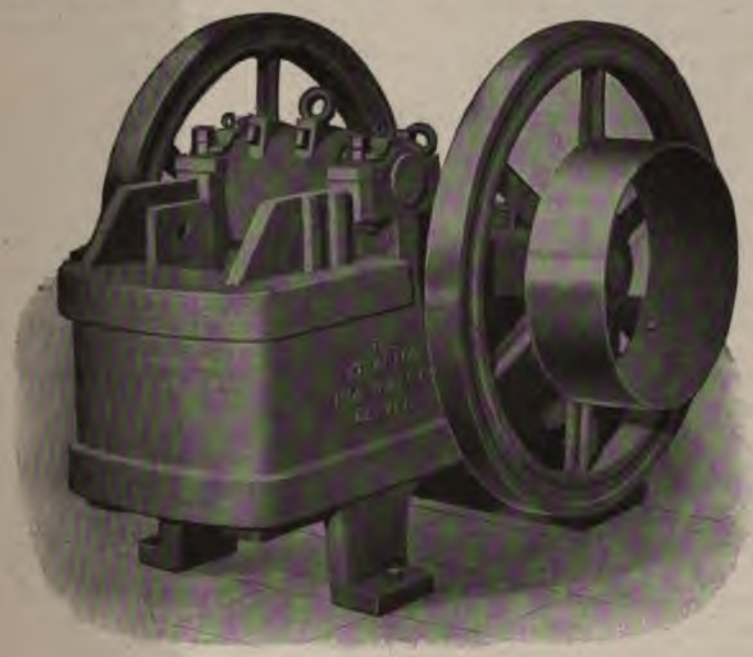
At a depth of 880 feet he found the veins to be 2,330 feet long, with an average width of three feet. The first ore removed cost the company $40 a ton, while that now mined costs only $2.70 a ton.

MACHINERY AND EQUIPMENT

Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.

JAW CRUSHERS.

It should be understood by all mill men that the crusher of either the Blake or the Dodge type is the most efficient, economical and rapid machine for the preparatory reduction of ores, and it should be an axiom in every mill to reduce the ore in the crusher to the smallest possible size before allowing it to go to the stamps or other machinery. While the Blake



type of crusher is the most efficient for reducing to 1½-inch size, the Dodge type is capable of reducing ores to a much smaller size, against which it has a smaller capacity.

In some cases it is well to use the Blake crusher for reducing to 2-inch or 3-inch size, thence passing the product to a Dodge or Blake-Dodge crusher for further reduction. While designed for rough usage, the efficiency of a crusher depends on keeping the bearings tight and well oiled, and the jaw surfaces as even as possible. These crushers are sold by the Colorado Iron Works Company of Denver.

OFFICIAL REPORT CALUMET & HECLA.

For the fiscal year ending April 30, 1907, this famous Lake company reports an output of 46,949 tons of refined copper, which was sold at prices varying from 18¾ to 26¼ cents per pound, f. o. b. New York. The assets are: Cash at mine, $197,667; cash at New York, $15,000; cash at Boston, $6,264,523; development and equipment fund, $45,145; insurance fund, $949,841; bills receivable, $1,281,769; employes' aid fund, $3,499; total, $8,757,444, which compares with $11,916,681 a year ago; showing a decrease of $3,159,237. Of this decrease $1,782,399 is in the development and equipment fund. Liabilities are: Drafts in transit, $127,606; bills payable, $1,100,895; notes of the Keweenaw Association, $500,000; total, $1,728,502, leaving a profit and loss surplus of $7,028,942. The company has a capitalization of $2,500,000. Dividends for the year amounted to $6,500,000.

During the year the company purchased shares in the following companies:

	Issued.	Purchased.
Allouez	100,000	42,978
Centennial	90,000	46,080
Frontenac	20,000	20,000
Gratiot	100,000	50,100
La Salle	302,977	161,750
Manitou	20,000	18,000
Osceola Con.	96,150	22,671
Superior	100,000	50,100

The 111,729 shares of Allouez, Centennial and Osceola Consolidated, equivalent to 39.1 per cent. of the 286,150 shares issued by these companies, were purchased by the Calumet & Hecla for $7,398,267.

President Agassiz says that "last winter we joined the St. Mary's Mineral Land Company, the Caldwell Copper Company, the Sheldon and Douglas Estates Companies, and the shareholders of the Tecumseh Copper Company in organizing the La Salle Copper Company as a corporation under the laws of Michigan with a capital of 400,000 shares. This new company, through the ownership of shares in the Tecumseh Copper Company, and by the conveyance from the other said companies, owns and controls about 2,460 acres, a large part of which carried the Kearsarge lode. These lands adjoin lands of the Osceola company on the north. For our contribution of 240 acres and $1,000,000 cash to the treasury of the La Salle Copper Company, together with our engagement to lend that company $750,000, if needed for its operations, this company received 161,750 shares of the 302,977 shares issued There remain in the treasury of the La Salle Copper Company 97,023 shares.

"We have obtained an option extending to November 20, 1907, for the examination of the Mamainse and Pointeaux mine lands in Canada on the eastern shore of Lake Superior. We also have an option on lands of A. H. Sibley near Nonesuch lands, extending to May 1, 1910.

"In securing the lands of the Dana Copper Company contiguous to the lands of the Frontenac Copper Company we purchased, for $40,000, 36,400 shares out of a total of 40,000 shares of the Dana Copper Company.

"At the Lake Linden smelting works we have erected a new cupola furnace of greater capacity than the old one. Five refining furnaces and one blister furnace have been rebuilt and the greater part of the power used at the works is now transmitted electrically. A new mineral house of capacity of about 20,000 tons has been built at a locality convenient for shipping. At the Buffalo smelting works we are preparing to increase our electrolytic plant and are erecting a tank building

capable of treating 20,000,000 pounds of anodes.

"During the year we expended on the development and equipment of the Gratiot mine about $85,000. The showing is good and warrants further work under the terms of our option. By the exercise of our option from the Superior Copper Company we are now the owners of 50,100 shares of the stock of that company.

"Our object in securing voice in the management of the Osceola and the other companies above named was to increase production and lower costs, and our purpose was not, and its effect could not be, to monopolize or control the price of copper of any kind."

RICHNESS OF COBALT ORES.*

By Dr. Albert R. Ledoux.

I have been asked by several members of the Institute what is the grade of Cobalt ores, as determined by my sampling works at Jersey City. Since January, 1905, we have handled at our works 366 carload lots of this ore, and fifty-two other lots less than carloads, including what we call nuggets, the nuggets, either coming separately consigned or as part of a carload. I do not feel at liberty to state the assays of any particular lots of nuggets, as there have been some delicate questions concerning the value of some of these "Bonanza Shipments." These nuggets, as you are aware, are not pure silver, but run anywhere from 700 parts to 870 parts of silver in the thousand. There are more or less gangue and other minerals associated with the silver, and the metallic silver itself, visibly free from gangue, runs about 950 fine. Leaving out of consideration the nuggets and native silver, and including only the lots of regular ore, a review of 394 lots sampled shows that the highest lot ran 7,402 ozs. of silver to the ton, the next in order being 6,909, 6,413, 6,163 and 5,948 ozs. per ton. In the 394 lots we found:

Over	6,000 ozs.			4 lots	(say)	1%
Between	5,000 ozs	and	6,000 ozs.	3 lots	(say)	0.75%
Between	4,000 ozs.	and	5,000 ozs.	12 lots	(say)	3%
Between	3,000 ozs.	and	4,000 ozs.	17 lots	(say)	4.25%
Between	2,000 ozs.	and	3,000 ozs.	39 lots	(say)	10%
Between	1,000 ozs.	and	2,000 ozs.	72 lots	(say)	18.25%
Between	900 ozs.	and	1,000 ozs.	11 lots	(say)	2.75%
Between	800 ozs.	and	900 ozs.	7 lots	(say)	1.75%
Between	700 ozs.	and	800 ozs.	12 lots	(say)	3%
Between	600 ozs.	and	700 ozs.	21 lots	(say)	5.25%
Between	500 ozs.	and	600 ozs.	10 lots	(say)	2.5%
Between	400 ozs.	and	500 ozs.	13 lots	(say)	3.25%
Between	300 ozs.	and	400 ozs.	20 lots	(say)	5%
Between	200 ozs.	and	300 ozs.	44 lots	(say)	11.25%
Between	100 ozs.	and	200 ozs.	66 lots	(say)	17%
Less than	100 ozs.	and		43 lots	(say)	11%

You are of course aware that while the greater part of shipments of cobalt come to New York, some have gone abroad and many have gone to Copper Cliff.

It seems to me that this is a remarkable showing for a camp so young as Cobalt, the first car having reached our sampling works about February 1, 1905.

Silver, of course, in point of value, is the more important element. The highest percentage of cobalt found in any one shipment is 11.96 per cent., the average being 5.99 per cent. The highest assay for nickel in any car is 12.49 per cent., the average being 3.66 per cent. The highest percentage of arsenic is 59.32 per cent., the average 27.12 per cent.

Discussion.

Mr. Campbell: Could you tell us, in the case of these nuggets and of the silver, what it is which makes them less than 1,000 fine?

Dr. Ledoux: There are mixed up with the nuggets other minerals; sulphides, arsenic, etc., and the gangue matter. We have paid no attention as to what reduces the fineness of the native silver; we do not know what it is.

*Paper read before the Canadian Mining Institute.

TIN IN THE BLACK HILLS.

A Black Hills communication in the Los Angeles Mining Review will be of interest to those who are seeking information in relation to tin deposits:

"For many years some of the mines of this and neighboring districts of the Central and Southern Black Hills have given much trouble in their reduction, being what is commonly called base. The trouble lies, evidently, in the fact that the ores nearly all contain arsenic in the form of mispickel. In some of the mines this mineral is found in masses, the vein being "solid metal." In others the mispickel is disseminated through the ven quartz. It is all auriferous, and in some mines rich. Most frequently it will assay (the concentrates or solid ore), from $12 to $150 per ton gold. Occasionally it is richer than the higher figure and sometimes contains only a trace of gold. Generally it has been found very difficult to secure extraction of the gold from this ore in excess of fifty per cent. of its assay value. This makes mining very expensive and usually unprofitable here. If we could increase extraction to eighty per cent. some of the mines now idle would yield a very satisfactory profit.

"There are similar ores elsewhere that are treated with satisfactory per centage of extraction, and at good profit. Occasionally the gold will yield to amalgamation so freely as to make the ore anything but objectionable, whereas in other cases it is only with great difficulty that a small per centage of the gold can be saved by plate amalgamation.

"In those instances where the gold cannot be recovered by either plate or pan amalgamation, roasting should be resorted to, and if this be carefully carried on by an experienced man the gold can generally be amalgamated, if not on plates, in pans. The roasting of the ores causes the arsenic and sulphur to pass off in fumes. The arsenic may be condensed in a chamber of suitable construction and sold as crude arsenic, or it may be refined before sending to market. At Del Oro, Canada, ore of the kind herein described was roasted, the arsenic condensed in chambers, and the roasted pulp then treated by the bromo-cyanide process to extract gold. The operation is said to have been profitable and was continued until the mines were worked out."

Heinze in Luck Once More

According to the latest reports from Butte the rich vein of copper ore that was discovered two weeks ago, on the Lizzie claim of the Davis-Daly Company, is ten feet wide and assays 8 6-10 ounces of silver, while the copper ranges from 3¼ per cent. to 4 6-10 per cent. Arrangements have been made for shipping ore at once to the Washoe smelter. The Davis-Daly is one of F. Augustus Heinze's properties.

The strike on the Lizzie claim, which is believed to be the most important yet made in the ground of the Davis-Daly, was made at a depth of 100 feet. A drift has been started east and west of the point of intersection. While not so large a vein as the one in the Original crosscut the new find is impact and rich.

Capitalization and Dividends of North American Mines and Works

Gold, Silver, Copper, Lead, Nickel, Quicksilver and Zinc Companies.

NAME AND LOCATION OF COMPANY.	Author-ized Capital Stock.	Shares Issued.	Shares Par Val.	Dividends Paid in 1907	Dividends Total to Date.	Dividends Latest Date.	Dividends Latest Amt.
Acacia, g., Colo	$ 1,500,000	1,433,000	$ 1	.....	$ 73,780	Dec. 1904	$0.01
Adams, s, l, c, Colo	1,500,000	150,000	10	.....	746,000	Jan. 1905	.05
Aetna, Con., q, Cal	500,000	100,000	5	.....	325,000	April. . . . 1900	.15
Alaska Goldfields, Alaska	1,500,000	250,000	5	.....	260,000	Jan. 1901	.15
Alaska Mexican, g, Alaska	1,000,000	180,000	5	90,000	1,595,381	Jan. 28 . 1907	.50
Alaska Treadwell, g, Alaska	5,000,000	200,000	25	200,000	8,585,000	Jan. 28 . 1907	1.00
Alaska United, g, Alaska	1,000,000	180,200	5	54,060	280,200	Jan. 28. . 1907	.30
Alice, Mont.	1,000,000	400,000	25	.....	1,115,000	Jan. 1899	.05
Amalgamated, c, Mont.	155,000,000	1,530,879	100	6,123,518	49,540,746	May 27. . 1907	2.00
Am. Sm. & Ref., com, U. S	50,000,000	500,000	100	1,750,000	10,500,000	April 15 . 1907	1.75
Am. Sm. & Ref., pf, U. S	50,000,000	500,000	100	1,750,000	24,331,553	April 1. . 1907	1.75
Am. Sm. Securities, A pf, U. S	17,000,000	170,000	100	510,000	2,295,000	June 1 . 1907	1.50
Am. Sm. Securities, B pf, U. S	30,000,000	300,000	100	750,000	3,000,000	June 1 . 1907	1.25
Am. Zinc, L. & Sm., Mo	3,750,000	150,000	25	.....	180,000	Jan. 1904	1.00
Anaconda, c, Mont.	30,000,000	1,200,000	25	4,200,000	35,100,000	Apr. 18. . 1907	1.75
Annie Laurie, g, Utah	5,000,000	25,000	100	.....	439,561	Apr. 1905	.50
Atlantic, c, Mich	2,500,000	100,000	25	.....	990,000	Feb. 1905	.50
Bald Butte, g, s, Mont	250,000	200,000	1	.....	1,337,148	Jan. 1904	.12½
Baltic, c, Mich.	2,500,000	100,000	25	.....	2,650,000	Dec. 17. . 1906	8.00
Beck Tunnel Con., Utah	1,000,000	1,000,000	1	200,000	800,000	May 20 . 1907	.04
Boston, q, Cal	1,000,000	100,000	10	.....	20,000	Apr. . . . 1903	.06
Boston & Colo. Sm., Colo	750,000	15,000	10	.....	402,350	Oct. . . . 1902	.75
Boston Gold Copper, Sm., Colo	1,000,000	1,000,000	1	.....	150,000	Nov. . . . 1901	.02½
Boston & Mont. Con., c, s, g, Mont	3,750,000	150,000	25	3,600,000	54,325,000	May. . . . 1907	12.00
Breece, l, s, Colo	5,000,000	200,000	25	.....	200,000	June. . . . 1903	.05
Brunswick Con., g, Cal	500,000	135,770	1	.....	13,577	Dec. 20. . 1906	.03
Buffalo Hump, g, Idaho	1,000,000	100,000	10	.....	300,000	Jan. . . . 1901	.10
Bullion-Beck & Champion, Utah	1,000,000	100,000	10	20,000	2,770,000	Apr. 15. . 1907	.10
Bunker Hill & Sullivan, Idaho	3,000,000	300,000	10	900,000	8,766,000	May 4 . . 1907	.60
Butte & Boston, c, Mont	2,500,000	200,000	25	.....	1,800,000	Feb. . . . 1904	1.00
Butte Coalition, c, Mont	15,000,000	1,000,000	15	1,000,000	1,800,000	June 26 . 1907	.50
Butterfly Terrible, g, Colo	1,500,000	1,250,000	1	.....	31,250	Oct. . . . 1901	.00½
Calumet & Arizona, c, Ariz	2,500,000	200,000	10	2,000,000	8,000,000	June 1 . 1907	5.00
Calumet & Hecla, c, Mich	2,500,000	100,000	25	2,000,000	101,350,000	Mar. 22. . 1907	20.00
Camp Bird, g, Colo	5,000,000	820,000	5	393,600	3,427,704	Apr. 27. . 1907	.24
Cariboo McKinney, g, B. C	1,250,000	1,250,000	1½	.....	546,837	Feb. . . . 1904	.04
Carisa, g, s, c, Utah	500,000	500,000	1	.....	140,000	Dec. . . . 1906	.01
Cashier, g, Colo	1,000,000	900,000	1	.....	26,160	Apr. . . . 1904	.00½
Centennial Eureka, g, s, l, c, Utah	5,000,000	100,000	25	.....	2,917,700	Feb. . . . 1905	1.00
Center Creek, l, z, Mo	1,000,000	10,000	10	.....	200,000	June. . . . 1905	.10
Central Eureka, g, Cal	4,000,000	400,000	10	.....	799,159	Mar. . . . 1906	.05
Century, g, s, l, Utah	150,000	150,000	1	3,000	33,000	Feb. 15. . 1907	.02
Champion, c, Mich.	2,500,000	100,000	25	200,000	1,800,000	June . . . 1907	1.00
C. K. & N., g, Colo	1,500,000	1,431,900	1	.....	229,104	Dec. . . . 1904	.01
Clinton, g, s, Colo	100,000	1,000	100	.....	60,000	Dec. . . . 1903	.30
Columbus Con., g, s, Utah	1,500,000	283,333	5	99,167	99,167	Apr. 5. . . 1907	.20
Colwyn, Idaho	500,000	400,000	1	.....	4,000	Aug. . . . 1906	.01
Combination, g, Nev.	400,000	360,000	1	.....	873,000	Dec. . . . 1906	.15
Con. Cal. & Va., s, g, Nev	540,000	216,000	2½	.....	3,963,600	July. . . . 1901	.10
Con. Mercur, g, Utah	5,000,000	1,000,000	5	.....	1,180,000	Dec. 19. . 1906	.02½
Con. M. & S. of Canada, g, s, c, B. C	5,500,000	48,338	100	221,688	594,100	May. . . . 1907	2.50
Consolidated, g, Colo.	2,500,000	1,900,000	1	.....	380,000	Mar. . . . 1902	.01
Continental, z, Mo.	550,000	22,000	25	22,000	209,000	Apr. 1. . 1907	.50
Copper Range Con., Mich.	38,500,000	383,781	100	767,562	4,989,153	Apr. 1. . . 1907	2.00
Creede & Cripple Creek, g, Colo.	800,000	800,000	1	.....	16,000	May. . . . 1901	.02
Creede United, g, Colo	500,000	500,000	1	.....	187,500	July. . . . 1906	.00½
Cripple Creek, g, pf, Colo	125,000	125,000	1	.....	45,000	Jan. . . . 1902	.04
Cripple Creek Con., g, Colo	2,000,000	2,000,000	1	.....	180,000	Mar. . . . 1905	.00½
Croesus, g, Calif.	1,000,000	200,000	5	.....	227,300	Aug. . . . 1901	.05
Crowned King ,g, s, Ariz.	6,000,000	600,000	10	.....	242,760	May. . . . 1901	.02
Dalton & Lark, g, s, l, Utah	2,500,000	2,500,000	1	.....	350,000	July. . . . 1901	.10½
Daly-Judge, Utah	300,000	300,000	1	225,000	225,000	Apr. 12. . 1907	.37½
Daly, g, s, l, Utah	3,000,000	150,000	20	.....	2,925,000	Mar. . . . 1897	.25
Daly-West, g, s, l, Utah	3,600,000	180,000	20	108,000	5,507,000	Mar. 15. . 1907	.60
De Lamar, g, s, Idaho	400,000	67,180	5	.....	2,926,370	May. . . . 1905	.72
Deadwood-Standard, pf, So. Dak.	600,000	600,000	1	.....	6,000	Dec. . . . 1903	.01
Dewey Con., g, Utah	310,000	10,000	1	.....	5,850	June. . . . 1901	.10
Diamondfield, g, Nev.	1,000,000	732,000	1	.....	14,650	Sept. . . . 1905	.02
Dollon, g, Colo.	1,250,000	1,250,000	1	.....	156,250	Nov. . . . 1905	.01
Doctor-Jack Pot Con., g, Colo	3,000,000	3,000,000	1	.....	267,000	July. . . . 1906	.00½
Doe Run, l, Mo.	10,000,000	59,062	100	59,062	1,106,134	Apr. 15. . 1907	.50
Elkton Con., g, Colo.	3,000,000	2,500,000	1	75,000	1,570,200	Apr. 24 . 1907	.01½
El Paso, g, Colo	2,500,000	2,500,000	1	.....	1,242,045	Dec. 24. . 1906	.02
Empire, z, Wis.	30,000	500	60	25,000	230,000	May 15 . 1907	10.00
Federal Sm., com., Idaho	10,000,000	60,000	100	300,000	2,073,750	Apr. 15 . . 1907	5.00
Federal Sm., pf, Idaho	20,000,000	120,000	100	210,000	2,674,250	Mar. 15. . 1907	1.75
Florence, s, Mont	2,500,000	400,000	5	.....	223,780	Mar. . . . 1900	.05
Frances Mohawk, g, Nev	1,000,000	910,000	1	182,000	318,500	Apr. 1. . . 1907	.10
Free Coinage, g, Colo.	1,000,000	10,000	100	.....	160,000	Dec. 1902	.20
Gemini-Keystone, Utah	500,000	5,000	100	.....	1,550,000	Dec. 1906	10.00
Gold Coin of Victor, Colo.	1,000,000	1,000,000	1	.....	1,230,000	Jan. . . . 1903	.01
Gold Dollar Con., g, Colo	2,500,000	2,500,000	1	.....	25,000	Dec. 15. . 1906	.00½
Gold King Con., g, Colo	6,000,000	5,750,370	1	.....	1,197,334	Dec. . . . 1905	.01
Good Hope, g, s, Colo	50,000	500	10	.....	150,000	Nov. . . . 1906	.25
Granby Con., c., B. C	15,000,000	135,000	100	810,000	2,563,360	June . . . 1907	3.00
Grand Central, g, Utah	250,000	250,000	1	70,000	1,228,750	May 15 . 1907	.04
Grass Valley Exploration, Calif	100,000	30,000	2	.....	30,000	Jan. . . . 1900	.25
Greater Gold Belt, g, Colo.	5,000,000	3,800,000	1	.....	76,000	June. . . . 1900	.02
Gwin, g, Calf.	1,000,000	100,000	100	.....	941,250	Jan. . . . 1903	.25
Homestake, g, S. D	21,840,000	218,400	100	436,800	16,080,350	Apr. 25. . 1907	.50
Horn Silver, g, s, c, z, l, Utah	10,000,000	400,000	25	20,000	5,602,000	Mar. 30. . 1907	.05
Imperial, c, Ariz	5,000,000	500,000	10	200,000	300,000	June 25 . 1907	.20
Independence Con., g, Colo.	2,500,000	2,500,000	1	.....	281,375	Apr. . . . 1901	.04
Ingham Con., g, Colo	750,000	1,359,000	½	.....	33,981	Aug. . . . 1901	.00¼
International Nickel, pf, U. S.	12,000,000	89,126	100	267,378	802,130	May 1. . .1907	1.50
Iowa, g, s, l, Colo.	1,666,667	1,666,667	1	.....	405,505	Oct. . . . 1904	.01
Iron Clad, g, Colo	1,000,000	1,000,000	1	.....	50,000	Nov. . . . 1906	.05
Iron Silver, Colo	10,000,000	500,000	20	200,000	3,750,000	April 1. . 1907	.20
Isabella g, Colo	2,250,000	2,250,000	1	.....	742,500	Mar. . . . 1901	.01
Jamieson, g, Calif.	3,900,000	390,000	10	23,400	84,000	Apr. 18 . 1907	.03
Katinka, g, Colo	1,000,000	1,000,000	1	.....	10,000	Nov. . . . 1901	.01
Kendrick & Gelder Sm., Colo	1,000,000	1,000,000	1	.....	20,000	Dec. . . . 1901	.01
Kendall, g, Mont.	2,500,000	500,000	5	75,000	1,290,000	May 23 . . 1907	.03
Kennedy, g, Calif.	10,000,000	100,000	100	.....	1,801,001	June. . . . 1900	.05
La Fortuna, g, Ariz.	250,000	250,000	1	.....	1,200,500	Oct. . . . 1902	.05
Lake City, Colo.	50,000	50,000	1	.....	63,875	May. . . . 1900	.02
Last Dollar, g, Colo	1,500,000	1,500,000	1	.....	12,500	Dec. . . . 1905	.01
Lexington, g, Colo	1,250,000	1,250,000	1	.....	110,857	Jan. . . . 1906	.15
Liberty Bell, g, Colo	700,000	130,551	1	.....	331,179	June. . . . 1906	.05
Lightner, g, Calif.	125,000	102,225	1	.....	240,000	Mar. . . . 1903	.02

Corrected to July 5, 1907.

NAME AND LOCATION OF COMPANY.	Author-ized Capital Stock.	Shares Issued.	Par Val.	Dividends Paid in 1907	Total to Date.	Latest Date.	Latest Amt.
Lucky Budge, z, Mo.	40,000	400	100	.....	46,800	Apr. . . . 1905	12.00
Lyon, z, l, Mo.	50,000	4,585	10	.....	2,117	Jan. . . . 1905	.20
Mammoth, g, s, c, Utah	10,000,000	400,000	25	.....	2,140,000	Dec. 20. . 1906	.05
Mary McKinney, g, Colo.	1,500,000	1,304,252	1	78,256	801,766	Apr. 25. . 1907	.03
Midget, g, Colo.	1,000,000	1,000,000	1	.....	195,000	Apr. . . . 1902	.15
Miller, Colo.	3,000,000	30,000	100	6,000	16,500	Jan. 31. . 1907	.03
Modoc, g, s, Colo.	500,000	500,000	1	.....	270,000	Dec. . . . 1903	.01
Mohawk, c, Mich.	2,500,000	100,000	25	400,000	900,000	Jan. 10. . 1907	4.00
Monitor, Idaho	1,000,000	1,000,000	1	9,200	9,200	Feb. . . . 1907	.01
Mont. Ore Purchasing, g, s, l, Mont.	2,500,000	81,000	25	1,215,000	9,448,119	Jan. 29. . 1907	15.00
Montana Tonopah, g, Nev.	1,000,000	885,000	1	.....	131,250	Aug. . . . 1905	.10
Morning Star Drift, g, Calif.	240,000	2,400	100	.....	854,400	Sept. . . . 1900	3.00
Mt. Diablo, s, Nev.	5,000,000	50,000	100	.....	260,271	Jan. . . . 1900	.10
Mt. Rosa, g, Colo.	1,000,000	994,850	1	.....	19,897	Nov. . . . 1905	.01
Napa Con., q., Calif.	700,000	100,000	7	.....	1,800,000	Oct. . . . 1902	.10
National Lead, com, U. S.	15,000,000	150,000	100	487,500	2,128,986	July 1 . . 1907	1.25
National Lead, pf, U. S.	25,000,000	250,000	100	875,000	17,407,580	June 15 . 1907	3.75
Nevada Hills, g, Nev.	5,000,000	750,000	5	75,000	150,000	Mar. 20. . 1907	.10
Nevada Keystone, g, Nev.	1,000,000	638,877	1	.....	61,700	Feb. . . . 1904	.03
Nevada King, Nev.	1,000,000	500,000	1	10,000	10,000	Apr. 25. . 1907	.02
New Century, z, Mo.	150,000	150,000	1	7,500	200,300	May . . . 1907	.01
New Idria, q, Cal.	500,000	100,000	5	40,000	920,000	Apr. 1. . . 1907	.20
New Jersey, z, U. S.	10,000,000	100,000	100	600,000	10,200,000	May . . . 1907	3.00
New Leadville Home, g, Colo.	2,000,000	2,000,000	1	.....	265,500	Feb. . . . 1902	.05⅝
New Zealand Con., g, Colo.	1,000,000	675,000	1	.....	129,600	Mar. . . . 1902	.01
North Butte, c, g, s, Mont.	9,000,000	400,000	15	1,600,000	5,000,000	June 25 . 1907	2.00
North Star, g, Cal.	2,500,000	250,000	10	50,000	1,356,356	Mar. 28. . 1907	.20
Northern Light, g, s, Utah.	2,000,000	400,000	5	.....	20,000	Feb. . . . 1904	.05
Nuggett, g, Colo.	1,000,000	991,000	1	.....	84,730	July. . . . 1901	.01
Old Colony Zinc, Mo.	1,000,000	69,909	10	.....	138,184	Nov. . . . 1901	.25
Old Gold, g, Colo.	2,101,150	2,101,150	1	.....	10,506	Mar. . . . 1904	.00½
Ontario, s, l, Utah.	5,000,000	50,000	100	.....	14,962,500	Dec. . . . 1902	.30
Ophir, g, s, Nev.	302,400	100,800	3	.....	1,797,400	July. . . . 1904	.25
Osceola, c, Mich.	2,500,000	96,150	25	576,900	6,362,000	Jan. 24. . 1907	6.00
Osceola, l, z, Mo.	500,000	98,000	5	39,200	225,400	Apr. 25. . 1907	.10
Oustomah, g, Cal.	250,000	250,000	1	.....	12,500	Mar. . . . 1904	.05
Parrot, c, Mont.	2,300,000	229,850	10	114,924	6,864,720	June 19 . 1907	.25
Pennsylvania Con., g, Cal.	5,150,000	51,500	100	.....	326,125	Mar. . . . 1906	.10
Penn-Wyoming, c, Wyo.	10,000,000	5,500,000	1	137,500	531,250	Apr. 15. . 1907	.01¼
Petro, g, s, Utah.	800,000	800,000	1	.....	65,000	Aug. . . . 1906	.04
Plumas-Eureka, g, Cal.	1,406,250	150,625	10	.....	2,831,294	Apr. . . . 1901	.06
Portland, g, Colo.	3,000,000	3,000,000	1	240,000	7,387,080	Apr. 25. . 1907	.04
Quartette, Nev.	1,000,000	100,000	10	30,000	355,000	Mar. 30. . 1907	.15
Quicksilver, pf, Cal.	4,300,000	43,000	100	.....	1,931,411	May. . . . 1903	.50
Quincy, c, Mich.	3,750,000	150,000	25	1,350,000	17,945,000	June 10 . 1907	4.50
Quincy, l, s, g, c, Utah	75,000	125,000	½	.....	1,100,000	Mar. . . . 1902	1.50
Raisbeck Fairplay, z, Wis.	12,000	12,000	1	.....	1,200	June. . . . 1906	.10
Richmond, g, s, l, Nev.	1,350,000	54,000	2	.....	4,453,797	Dec. . . . 1900	.01
Red Bird, g, s, c, l, Mont.	1,500,000	300,000	5	.....	72,000	Dec. . . . 1904	.01
Red Metal, Mont.	1,000,000	100,000	10	400,000	1,200,000	Mar. 1. . 1907	4.00
Red Top, g, Nev.	1,000,000	1,000,000	1	.....	50,000	Feb. . . . 1906	.05
Rob Roy, z, Mo.	15,000	14,325	1	.....	11,969	May. . . . 1906	.03
Sacramento, g, Utah.	5,000,000	1,000,000	5	.....	308,000	Dec. . . . 1906	.00½
St. Joseph, l, Mo.	20,000,000	1,000,000	10	150,000	5,138,357	Mar. 15. . 1907	.15
Santa Rita, g, Colo.	1,000,000	1,000,000	1	.....	4,000	July. . . . 1900	.02
St. Rose, z, Wis.	75,000	750	100	.....	22,500	May. . . . 1906	6.00
Shannon, c, Ariz.	3,000,000	300,000	10	150,000	450,000	Mar. 30. . 1907	.50
Silver Hill, g, s, Nev.	180,000	180,000	1	.....	82,800	Mar. . . . 1906	.05
Silver King, g, s, l, Utah.	3,000,000	150,000	20	150,000	10,900,000	Mar. . . . 1907	.33⅓
Silver Shield, g, Utah.	300,000	300,000	1	.....	4,500	Feb. . . . 1901	.00½
Smuggler, s, l, z, Colo.	1,000,000	1,000,000	1	.....	2,235,000	Nov. . . . 1906	.03
Snowstorm, Idaho	1,500,000	1,500,000	1	135,000	225,000	Apr. . . . 1907	.03
Southern Boy, g, Colo.	1,250,000	875,000	5	.....	17,500	May. . . . 1900	.02
Standard Con., g, s, Cal.	2,000,000	178,394	10	17,839	4,240,597	Mar. 26. . 1907	.10
Standard, c, Ariz.	500,000	400,000	1	.....	40,000	Sept. . . . 1902	.50
Stratton's Cripple Creek, Colo.	2,000,000	2,000,000	1	50,000	100,000	Mar. . . . 1907	.02½
Stratton's Independence, g, Colo.	5,500,000	1,000,007	5	.....	5,028,568	Dec. . . . 1906	.12½
Stratton's Leasing, Colo.	500,000	500,000	1	.....	50,000	Jan. . . . 1906	.10
Strong, g, Colo.	1,000,000	1,000,000	1	.....	2,275,000	July. . . . 1905	.02½
South Swansea, c, s, l, Utah.	300,000	300,000	1	.....	170,000	Apr. . . . 1904	.01
Swansea, s, l, Utah.	500,000	100,000	5	5,000	334,500	Mar. 20. . 1907	.05
Syndicate, g, Cal.	100,000	100,000	1	.....	82,000	Aug. . . . 1902	.02
Tamarack, c, Mich.	1,500,000	60,000	25	180,000	9,180,000	Jan. 24. . 1906	3.00
Tennessee, c, Tenn.	5,000,000	200,000	25	250,000	1,125,000	Jan. 28. . 1907	1.25
Tetro, g, l, Utah.	300,000	300,000	1	.....	18,000	Dec. . . . 1904	.01
Tomboy (New), g, s, Colo.	1,500,000	300,000	5	.....	1,803,000	Dec. . . . 1906	.50
Tonopah-Alpine, g, Nev.	700,000	700,000	1	.....	70,000	Dec. . . . 1903	.10
Tonopah-Belmont, g, Nev.	2,000,000	1,150,000	1	115,000	356,500	April 1. . 1907	.10
Tonopah Extension, g, s, Nev.	1,000,000	928,433	1	.....	278,530	Apr. . . . 1906	.15
Tonopah, g, s, Nev.	1,000,000	1,000,000	1	700,000	2,650,000	Apr. 22. . 1907	.35
Tonopah-Midway, g, Nev.	1,000,000	1,000,000	1	50,000	250,000	Jan. 1. . . 1907	.05
Town Topics, g, s, Colo.	1,000,000	1,000,000	1	.....	50,000	Nov. . . . 1903	.00½
Trimountain, c, Mich.	2,500,000	100,000	25	.....	300,000	June. . . . 1903	1.50
Trinity County, g, Cal.	1,000,000	99,003	10	.....	34,561	July. . . . 1903	.05
Uncle Sam Con., Utah.	500,000	500,000	1	.....	145,000	Dec. . . . 1906	.01
Union, g, Colo.	1,250,000	1,250,000	1	.....	444,244	Jan. . . . 1903	.02
United, c, pf, Mont.	5,000,000	50,000	100	150,000	1,500,000	May 15. . 1907	3.00
United, c, com, Mont.	45,000,000	450,000	100	1,687,500	5,337,500	Apr. 29. . 1907	1.75
United, z, l, pf, Mo.	1,000,000	14,556	25	14,556	196,971	Apr. 15. . 1907	.50
United, z, l, com, Mo.	5,000,000	92,400	5	.....	27,490	Oct. . . . 1903	.05
United (Cripple Creek), Colo.	5,000,000	4,009,100	1	.....	280,071	Apr. . . . 1905	.00½
United Globe, c, Ariz.	2,300,000	23,000	100	.....	299,000	June. . . . 1906	6.50
United Metals Selling, U. S.	5,000,000	50,000	100	1,375,000	4,875,000	Apr. . . . 1907	7.50
United Verde, c, Ariz.	3,000,000	300,000	10	1,125,000	22,720,322	May . . . 1907	.75
U. S. Red. & Ref., com, Colo.	6,000,000	59,188	100	.....	414,078	Oct. . . . 1903	1.00
U. S. Red. & Ref., pf, Colo.	4,000,000	39,458	100	1,183,740	1,716,749	July . . . 1907	1.50
U. S. Sm., Ref. & Mg., com, U. S., Mex.	37,500,000	750,000	50	656,250	656,250	Apr. 15. . 1907	.87½
U. S. Sm., Ref. & Mg., pf, U. S., Mex.	37,500,000	469,748	50	822,058	1,967,528	Apr. 15. . 1907	.87½
Utah, s, l, Utah	1,000,000	90,000	10	13,500	242,000	May 14 . . 1907	.03
Utah Con., c, Utah.	1,500,000	300,000	5	1,350,000	6,486,000	Apr. 15. . 1907	1.50
Victoria, g, s, l, Utah.	250,000	250,000	1	30,000	192,500	May 15 . . 1907	.04
Vindicator Con., g, Colo.	1,500,000	1,500,000	1	90,000	1,605,000	Apr. 25. . 1907	.03
Wasp No. 2, g, S. D.	500,000	147,900	1	.....	240,595	Dec. . . . 1906	.01
West Mt. Placers, Utah.	500,000	248,300	1	.....	180,390	June. . . . 1906	.01
Wolverine, c, Mich.	1,500,000	60,000	25	600,000	4,530,000	Apr. 1. . . 1907	10.00
Work, g, Colo.	1,500,000	1,500,000	1	15,000	105,000	Apr. 1. . . 1907	.01
Yak, Colo.	1,000,000	1,000,000	1	60,000	767,685	Mar. 25. . 1907	.06
Yankee Con., g, s, l, Utah.	500,000	500,000	1	15,000	167,500	Jan. 21. . 1907	.03½
Yellow Aster, g, Cal.	1,000,000	100,000	10	10,000	593,000	May 4 . . 1904	.10
Zoe, g, Colo.	500,000	1,500,000	1	.....	7,500	Dec. . . . 1900	.00

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See Rubber Goods.

(Continued on Page 29.)

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(Continued from Page 28.)

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(Continued on Page 31.)

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OBITUARY.

(Continued from Page 19.)

from the Baker party and were lost in that wilderness of mountains.

The majority of the Baker party perished but Charlie claimed that the Lord was more merciful to him than he deserved. The Baker party originally numbered twenty-three men. It was late in the fall and at that time there were very few passable trails even for a burro. In the early sixties he was associated with J. Q. A. Rollins in the manufacture of salt in South Park, about twenty miles from Fairplay. Salt at that time was worth 10 cents a pound and they made money.

When the Leadville boom started in 1878, Charlie was there, and in company with H. A. W. Tabor and others, put in the gas works and other city improvements. Subsequently himself and associates built the Pueblo gas works, and all his days in Colorado he was prominently identified with the upbuilding of the commonwealth. He served two terms in the Territorial Legislature, from Park county, and filled other positions of trust and honor in the times that tried men's mettle.

In the early days he made a lot of money out of the Dolphin mine, the Nisi Prius and the State Street shaft at Leadville. Associated with Dennis Sullivan and others he also made a large amount of money out of the Mylo group of mines in the Ten-Mile district, and later was a member of the firm of Tabor, Bush & Hall, who built the Windsor hotel of this city.

He took an active part in the Civil War, organizing a company of which he was captain. His most signal service was the capture and breaking up of the guerillas which were devastating this part of the country and he was in the noted Indian battle of Sand Creek.

For fifteen years he had been associated with Dennis Sullivan in a rich and highly profitable gold mine at Mesa, Arizona, and the Hall estate owns the Frederica mine in Burns' gulch, San Juan county, including valuable property in Ouray county, San Miguel county, Leadville and other mining districts.

He is survived by two daughters, Mrs. Minnie Hall-Perry, Mrs. George Wessels, and a grand-daughter, Miss Antoinette Perry, a brilliant actress. An only son, Charles A. Hall, died in Denver about a year ago. Mrs. Mary M. Hall, the beloved wife and mother, died in 1899.

Beryl is almost always found in distinct crystals in granite rocks with feldspar and quartz. It is valuable for jewelry when transparent and rich grass-green (emerald) or sea-green (aqua-marine).

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BUYERS' GUIDE

(Continued from Page 29.)

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Our Postal Relations With Mexico

So much American capital and enterprise are going into Mexico, that by reason of it very friendly relations are growing up between the two republics. It seems a postal convention has just been held which will prove of great benefit to both countries in the transmission of mailable matter to and fro. The terms are that all mailable matter of the United States will be accepted by the post office department of Mexico and transmitted the same as in this country. And the same regulation applies to Mexican mails entering the United States. The next step will be trade reciprocity fully established by international treaty between the two countries.

Colossal Fortunes

A writer in a magazine entitled Success says many of the vast fortunes in this country have been built up on the ignorance of the masses in regard to business methods. The sharpers bank on the ignorance of the people. They thrive on the credulity of their victims. Shrewd advertisements, cunningly worded circulars, flaming prospectuses, hypnotic appeals, bring out the hard earnings of the unsuspecting mortals, sometimes to the last dollar, only to go into the coffers of the cormorants who planned their blood-letting. It is going on every day all over this broad land, and still the hungry suckers continue to bite. Costly experience seems to have little or no reformatory effect. The victim is ever ready to be plucked. The foolkiller sees his opportunity, and the fool and his money soon part.

Richest Gold Mine Still Undiscovered

From Seattle come reports that the management of the Alaska-Yukon-Pacific Exposition, to be held in Seattle in the year 1909, proposes to reproduce at the exposition several of the famous mines of the north that made a score of millionaires from 1892 up to 1900. But the richest mine that the north has will not be reproduced, for the simple reason that no white man has ever seen it, and lived to tell the tale.

In the early days of the camp a certain tribe of Indians from the north arrived in Dawson for the first time. To the astonishment of the few that first saw the tribe, every member had several ornaments carved from great nuggets of virgin gold. This tribe had never met the white men before and to breathless inquiries the tribesmen told how near where they lived was a stream in which the yellow metal could be picked up in chunks as big as one's fist. Near by, they said, there was a cliff in which the metal stood out like moss on a mountain side.

The Indians soon learned the value of their ornaments and shrewdly refused to tell where they got the gold. Nevertheless, several prospectors tried to follow the tribe on the return to the northern village, but the wily redmen easily succeeded in losing the less agile paléface. Since then there has been several more or less secret and always unsuccessful expeditions to find the lost gold of the Indians.

Utah's "High Grading" Law

The following enactment of the last session of the Utah Legislature became a law and went into effect this year:

"All assayers, samplers and dealers in ore are required to keep records containing the amount of ore received by them, and the assay value thereof, the amounts paid therefor or advanced thereon, the mine or prospect from which said ore was extracted, or the person from whom procured, together with his name and address and the date of the transaction. These records shall at all times be accessible to any peace officer who demands an inspection thereof, and any further information said officer may require shall be given by the assayer, sampler or purchaser, to the best of his ability, and every person who defrauds, makes or publishes a wrong assay of ore or bullion, or who violates any provision of this act, is guilty of a misdemeanor."

Where Our Gold Goes To

The New York Journal of Commerce has prepared the following table, showing the world's production of gold since 1896; also the gold holdings of the government treasuries and banks of the leading countries, including the banks of the United States:

	Gold Production.	Held by Banks.
1897.....	$238,810,000	$2,197,845,000
1898.....	287,430,000	2,265,515,000
1899.....	306,725,000	2,260,540,000
1900.....	251,575,000	2,458,950,000
1901.....	260,990,000	2,645,440,000
1902.....	296,740,000	2,841,545,000
1903.....	325,960,000	2,930,565,000
1904.....	346,890,000	3,288,105,000
1905.....	381,250,000	3,460,260,000
1906.....	400,000,000	3,600,000,000

This shows a total of $3,096,370,000 for the ten years, while banks and government treasuries have increased their holdings by only about $1,402,155,000. The director of the mint estimates the world's consumption of gold in the arts at $80,000,000 yearly; ten years ago the estimate was around $60,000,000. This accounts for only $800,000,000 of a missing sum of nearly $1,700,000,000.

It must be that there are great sink-holes somewhere for gold. In all probability a lot of misers are hoarding it for a rainy day with which to line their coffins.

The Electric Smelting of Iron.

The Engineering Supplement of the London Times, published recently a criticism upon the electric smelting of iron, as reported by the Canadian press. Referring to Dr. Haanel's experiments at Sault Ste. Marie, it said:

A considerable amount of glorification appeared to be manifested in the Canadian press on account of the success of Dr. Haanel, Canadian superintendent of mines, in turning out some 50 tons of pig iron by electricity. It is stated that the following (among other) facts have been fully established by the experiments at Sault Ste. Marie:

1. Canadian ores, chiefly magnetite, can be economically smelted by the electro-thermic process.

2. Ores of high sulphur content can be made into pig iron containing only a few thousandths of sulphur.

3. The silicon content can be varied as required for the class of pig iron to be produced.

4. Titaniferous ores containing up to 5% can be successfully treated by the electro-thermic process.

We are informed that the consequence of the recent electric smelting operations would be "that Canada can undertake for itself the iron and steel industry, and will not in future have to import coal or ore for that purpose; that Canadian manufacturers will make from Canadian products tools and agricultural implements, build bridges, boats and railways and make the machinery to be used in thousands of busy factories." Without the slightest wish to decry the value of Dr. Haanel's researches, it may be pointed out that the premises are rather slender for the bold assumptions contained in the foregoing and other newspaper articles. Dr. Haanel, we believe, has no practical acquaintance with steel manufacture, and, although an able man in his own sphere—that of a pure physicist—would find great difficulty (at all events, anywhere away from Canada) in obtaining any credit, as an authority on the manufacture of iron or steel. There is no doubt that something on a large and perhaps even a commercial scale will be set on foot in Canada for the electric smelting of ores. It is stated, in fact, that the Lake Superior Power corporation have decided to acquire the government plant for the purpose of converting their stock of briquetted ore into marketable ferro-nickel pig. But altogether it may be said that the experiments so far have been conducted on much too small a scale to warrant any definite conclusion as to the results of a trial on an actual commercial basis.

Railways and Mining

In a thoughtful and interesting speech before the Mining Institute, at the recent annual banquet in Quebec, Dr. James Douglas strongly emphasized the importance of the railway development of the country by railways and especially of their necessity to the mining industry. (In effect, Dr. Douglas said that the railway must precede the substantial establishment of a mining industry.) This he illustrated by detailed accounts from his own experience in southwestern United States. In this connection it is interesting to note how several Canadian mining districts have opened up as a direct result of the incoming of the railway. The development of the nickel deposits of Sudbury resulted from the building of the Canadian Pacific railway; the coal mines of the Crow's Nest Pass, from the incoming of that branch of the same road; the discovery of the remarkable deposits of silver, nickel and cobalt, at Cobalt, from the construction of the Temiskaming and Northern railway, as has been commented upon by Professor Miller in a recent report; also the asbestos deposits of Thetford, in a like manner, owe much of their development to the Quebec Central railroad. Many other cases of similar import might also be mentioned. These, however, are sufficient to suggest, if suggestion is necessary, the great possibilities to be connected with the construction of the new Trans-continental Railway through Northern Ontario, Quebec and New Brunswick, and of the Grand Trunk Pacific through Northern British Columbia. This line, most of it through a new country, together with the many smaller lines, which will doubtless soon appear as feeders to it, must undoubtedly open a new era of development for the provinces whose natural resources are chiefly in their mineral wealth, as well as for the wheat fields of the prairie. Incidentally, too, it is for the government to make known the possible resources of these districts through which the railway passes, as accurately and as promptly as possible.

CADMIUM.

The Graselli Chemical Company, of Cleveland, Ohio, recently began the manufacture of metallic cadmium from Joplin zinc ore. This is the first attempt to produce metallic cadmium on a commercial scale in this country. Supplies heretofore have been obtained, duty free, from Belgium and Silesia. The price of metallic cadmium is $1.50 per lb., f. o. b. New York. The demand is not large. Advices from Silesia state that recently large quantities of cadmium in bars, 99.5% pure, were sold at 1,250 to 1,325 marks per 100 kgs. ($1.35 to $1.43 per lb.) according to quantity and delivery. Last year the Silesian producers received from 725 to 1,500 marks per 100 kgs. (78c to $1.63 per lb.).

THE FUEL TRADE OF FRANCE.

There was a substantial gain in the imports of fuel into France during the first half of the current year. Of coal there has been imported this year 7,422,710 tons, as against 7,209,320 tons for the first six months of 1906; of coke, 1,066,790 tons, against 1,158,250 tons; and of briquets 324,340 tons, against 267,600 tons. Much of the larger part of the coal imported came from Great Britain, namely, 4,884,640 tons, as against 4,179,090 tons in 1906.

The export trade has fallen off somewhat. During the first half of 1907 the exports of coal amounted to 593,800 tons, as against 643,010 tons in 1906; of coke, 70,600 tons, against 80,960 tons, and of briquets 44,190 tons, against 52,760 tons.

An unusually large number of tourists are taking in the San Juan this season. Some go to see the grandeur and glory of that region and others to investigate opportunities for investment.

The Patagonia District of Arizona

(By E. A. Hayes.)

There is gold, silver and copper enough in the bowels of Arizona to pay the debts of half a dozen nations and not the least of it all is the wealth of the so-called Patagonia region. The truth of it all reads stranger than fiction. Santa Cruz county is the youngest and smallest county in the territory and occupies a portion of the famous Gadsen purchase tract. If the line of survey had run as it was first marked out in the original bounds, it would have extended due west from the border city of Nogales, and given to Uncle Sam the headwaters of the Gulf of California. At it is, through the blunder of some one, the boundary line slants toward the northeast and leaves the delta of the Rio Colorado entirely in Mexico. Santa Cruz county and the Patagonia country rests on the slant boundary line between the United States and the famous Sonora country and Nogales is at the apex of the obtuse angle made by the boundary between the two nations. Look at a good map.

Patagonia has been more or less famous for a long time, but of recent years, and still more recently, its fabulous wealth has been attracting the attention of the outside world. Sonora has been the objective goal of the gold hunter, and Patagonia, just off the trail, has been passed by. So was Cripple Creek till a tenderfoot stubbed his toe on a nugget and everybody knows about Cripple Creek today; and everybody will know about Patagonia before many more moons come and wane.

The sleepy, yet wide-awake little village of Patagonia, is the hub or center of a circle the radius of which is about sixteen miles, and in almost every direction there is untold mineral wealth, besides broad fields and mesas for the herdsman and the agriculturalist.

Beginning at the northeast, and about twelve miles from Patagonia is what is known as the Hosey camp, bonded to a bunch of Phoenix people by Dr. Ray Ferguson and N. A. McDonald, the owners. This property is rich in copper which averages nearly twenty per cent. in its values. The ledge is a large one and immense quantities of ore are in sight. New machinery is to be put in place and good management and thrift mark the work of the outfit.

The Alto Copper Company, a short distance to the west from the Hosey camp, own several claims among which are the Burro, Bland and Viceroy. This property is being worked by Clark and Peterson, two enterprising, progressive mining men. The values are found in copper, silver and lead and they are piling up ore for shipment. It is all of high grade and great things are expected. More than 2,000 feet of work has been done. This mine is about fifteen miles from Patagonia and taking all things into consideration it is a bird.

Westerly from Patagonia lie the Eureka, Darwin, Moctetzuma and Bradford group of mines in what is known as the Tyndall district. These groups contain many claims and in the main are owned by Mr. C. H. Ferry, a Chicago millionaire. The main camp is on the Darien group and the work on all the claims is under the supervision of Mr. W. E. Balcom one of the most careful competent and reliable mining engineers in the country. His work shows skill, progress and economy. The district in which these important groups of mines are located is commonly called the Salero district and its history dates back to the days of Humbolt the explorer. More than a hundred years ago he came through the country with Jesuit priests and gold and silver was discovered in large quantities. The country was "gambosinoed," and from the silver obtained salt cellars were made and presented to the Jesuit fathers. Hence the name "Salero," which means salt cellar. Time fled away. Humbolt and his Jesuit friends are dead, but the Salero hills remain. As late as 1856 Prof. W. P. Blake, the eminent geologist and scientist, visited the country in the employ of the United States government and saw the wonderful richness of the country. Today Professor Blake at the advanced age of eighty-one years is the general manager of all this property for Mr. Ferry, and Mr. Bascom, the general superintendent, is one of Professor Blake's students.

The product of these mines is gold, silver and copper, much of the white metal running more than 500 ounces to the ton and the copper about twenty-five per cent. The gold product is not large. Native silver in places is abundant. New machinery is being put in place and diamond drills are seeking ore bodies in many places. The camp and its management is systematic and shows the work of a master mind. Pages could be written that would read like a tale of imagination, yet not an untrue word be said.

Not more than nine miles west and north of Patagonia lies the Happy Jack group, consisting of nine claims. No happier or more pleasant gentleman exists than W. H. Barnett, part owner and general manager. He is

Diagram Showing Properties in the Patagonia District of Arizona.

an expert in the mining business and has made the Happy Jack a safe and paying proposition. The ore is copper and silver and the last shipment netted over $50 a ton in car lots. Most of the product is chalcopyrite of high grade. The mine is in good shape, and Mr. Barnett is proud of it, and he has a right to be. Not far away from Patagonia, with plenty of wood and water and no obstacles in the way, the Happy Jack is destined to be a fortune maker, because it has the ore and a big bunch of it. The many friends of Superintendent Barnett are congratlating him on his good showings in his mine, for he is "genial as May and generous as autumn"; yet he is a hard-headed business man and a thoroughbred miner.

The Ivanhoe group is owned by James Johnson, a grim old mountain navigator. It is located about five miles southeasterly from Patagonia, and runs high in gold and silver. The shaft on the property is down about 100 feet and a tunnel has been driven into the mountain about 400 feet. Mr. Johnson is saying little, but "sawing wood," and his mine will surprise the natives before long. He recently sold a half interest in it for $25,000 gold, but retains the management.

Another prospect that is now attracting attention in the Patagonia camp is the American Boy group, about seven miles northwest of the town. There are nine claims in the group and they are being worked by Clark & Peterson. Some of the finest and highest grade copper in Arizona is being taken from these claims.

Not far away from the Hosey and American Boy groups, W. E. Balcom, the general superintendent of the Ferry property, owns the "Son of Vulcan." It consists of a forty-foot ledge of iron oxide, running from 50 per cent. to 60 per cent. iron, besides about 4 per cent. copper, 10 ounces silver and $2.50 gold. Mr. Balcom says that on this spot Vulcan had his blacksmith shop. He expects to win a fortune out of it and he is worthy of half a dozen.

The Banner Copper Company, of six claims and two under bond and lease, lies about six miles southwest of Patagonia. They have a three and one-half foot ledge running from 8 to 25 per cent. copper and considerable gold and silver. A carload of ore recently shipped to El Paso netted 8 per cent. copper, 15 ounces of silver and $4 gold to the ton.

W. R. Carper owns five claims called Fairplay. He has a three-foot ledge of fine ore running well up in gold, silver and copper.

Square away to the east about fifteen miles, F. D. Hale owns a group of sixteen claims; but not much has been done on them except the assessment work. His property is located at the headwaters of the Santa Cruz river, and old timers say that he has a mighty good thing out there. The ore runs well in gold, silver and copper and assays have been given him $265 in values. Mr. Hale intends to form a big company, if he can get in touch with the right people. He certainly has the ore.

About ten miles to the southeast of Patagonia, adjoining the Blue Nose, lies a group of claims belonging to R. T. Stump, Judge Marsteller of Nogales and others. They have a shaft down about 100 feet and the ore taken out is of high grade. The assays show 58 per cent. lead, 28 ounces silver and $4 in gold. The vein is about two feet wide. This property, like many others, is evidence of the mineral wealth of the region. Mr. Stump has charge of the development work.

The Mansfield group of claims lies in two sections, seven miles northwest of Patagonia. There are twenty-one claims in one section and seven in the other. The Hosey camp separates them. The country is rugged, evidently jurassic and volcanic. The country rock is porphyry, rhyolite and andesite. The first bunch of claims is about two miles long and half a mile wide. The ore veins can be traced the entire distance. Nearly a quarter of a century ago an old prospector named John Mansfield camped in the big gulch and since then it has been known as Mansfield's gulch. Later on and about two years ago, Mr. A. B. Richmond located the Mansfield group and turned it over to the Mansfield Mining & Smelting Company, and this concern now owns both groups of claims.

The management of the property is under the general supervision of Mr. Richmond, a careful mining engineer as well as a first-class business man. In one year's time he has built good roads to nearly every one of his claims, besides doing over 3,000 feet of underground work. His main shaft is on the A. C. Sweet claim and is now down about 300 feet. A first-class hoisting plant, air compressor and other machinery marks the place. When down 500 feet he will drift and crosscut the immense veins of sulphide copper, gold and silver that sweep away to the west across the country. On nearly every one of the claims composing the Mansfield property more or less work has been done, and in every instance tangible and unmistakable evidence has been found of high grade ores.

On the Black Cap claim, at the westerly end of the first group, a shaft is down something over 150 feet and in ore nearly all the way down. Besides the shaft a tunnel is being driven into the mountain, now about 140 feet. The breast of the tunnel is in ore, but neither wall of the vein has yet been encountered. From the point in the tunnel where it strikes the shaft 25 per cent. of the ore taken out runs more than $100 to the ton. This is being shipped. The balance of it is first-class milling ore. Ultimately the walls of the vein will be found and its width determined. The ore is a blend of chalcocite and chalcopyrite, besides running heavily in gold and silver. One four-ton lot of shipping ore assayed 14 per cent. copper, 169 ounces of silver and $85 gold to the ton. There is large quantities of this ore in sight. An average of eleven verified assays showed $112.29 in values.

The Mansfield group has had its mudslingers, but your correspondent laid every man's word aside and visited and carefully examined the property. The ore is there in place and so are the values. The Mansfield will ultimately be a mine, and a big one. It is in a mineral district that takes in the Salero hills, the Happy Jack, Hosey, American Boy and others. Red metal predominates in this vast region of minerals, and it all belongs to the Patagonia country.

The work of mining is being scientifically and systematically done by Mr. Richmond, and his camp shows evidence of care, thrift and first-class management. Three shifts of men are at work there. Within a year the company will erect a hundred-ton concentrating plant and ship to the Douglas or El Paso smelters. The property is only four miles from a railroad, and this fact adds greatly to the value of the property. Nearly all of the facts above were the result of a personal inspection of the property, and obtained from people not connected with it.

Just east of the Mansfield are a number of valuable prospects (known as the Sapho), from which many tons of valuable ore have been shipped. Some of it has assayed over 900 ounces in silver and more than 20 per cent. in gray copper. This claim is not a stone's throw from the Mansfield camp and on the same lead. H. W. Barnett owns it. The face of the country resembles Butte, Montana, and while the output of copper may not ever be as large, it will eventually make many fortunes.

The Mansfield company hails from Kansas City and is capitalized for $8,000,000. They have plenty of money

on hand and intend to use it to develop the property under the economic and progressive management of Mr. Richmond. Thus far he has proved himself a general in his battle with the rocks. He is building a mine that will yet attract the attention of the entire mining world.

Wench—This mine is owned by William Powers and Mrs. Ellen Farrel. It is located about ten miles south of Patagonia. The group contains four claims and a fraction. The work consists of two shafts 600 feet deep and 7,000 feet of drifting. This mine has produced over half a million dollars' worth of ore net. When the price of silver went down, the mine closed, and today it stands idle. More than 75,000 tons of ore are now on the dump that will run $12 easy. A large amount of ore is in sight in the mine, but the owners, on account of finances, are unable to work the property, the mine being full of water. The ore is silver, lead and gold and very rich, some running from 60 to 700 ounces of silver besides other values. This mine was worked more than 300 years ago by the Jesuits and the ore packed to Guaymas on burros and mules and thence sent to Spain in ships. The ledges are from five to six feet wide and the vein is a true fissure, easily worked. Mr. Porter is one of the pioneers of the country and it is a pity he cannot free his property of water and work it. It is a rich proposition and should interest capital. The writer knows the property and vouches for all that is said here.

Hardshaw District—In what is known as the Hardshaw district are located several important properties, among which are the Hardshell, World's Fair, French, Humboldt, Hermoso Chief, Josephine and others.

These mines are in the Patagonia mountains about ten miles southeast of Patagonia. The Hardshell contains twenty claims, and has been bonded by the owner, Hon. R. R. Richardson, to Los Angeles people and Ben Heney of Tucson. The Hardshell and Flux hereinafter mentioned is under the direction of C. C. Starr, E. M. The work on this mine consists of a shaft down about 500 feet and drifts to the extent of 1,000 feet. The ore is lead and silver and a fine showing is being made. Plenty of horn silver shows up on the surface. Copper is expected at greater depth. The machinery is first-class, work well done and assays show all the way from $15 to $1,000 per ton. There is a mighty good showing here for a big mine, and immense masses of ore in sight to back it. The mine has produced over $400,000

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The Flux, over the hills, about four miles away, owned by and bonded to the same people, shows copper, lead, silver and zinc. Recently a strike of valuable ore was made in the breast of the shaft that runs high in values. There is considerable zinc of high grade in it. The formation is lime and porphry and the cerussite crystals taken out have been sent to all parts of the world. Work is being systematically done and ore is being piled up for shipment. Much is expected of this property and from all appearances the hopes of the management will be realized, as the ore is of high grade.

Taking all things into consideration, the Flux group of mines is destined to become a record maker.

The Three Rs, a group of twenty claims, is located about eight miles southwest of Patagonia. The property belongs to the Hon. R. R. Richardson, one of the pioneers and sterling men of the country. Mr Richardson resembles the late Prince Bismarck, chancellor of the German empire, and is a man of nerve and iron. He has done much to promote this section of the country, and is looking forward to the time when Patagonia will be one of the largest and richest camps in this region of vast mineral wealth The Three Rs has recently been bonded to Green (William C.) & Kirk of Cananea, and at the proper time they intend to push work and develop this and other properties. The ore is copper of very high grade. Unless it was a mighty good proposition, Colonel Green would not be afield with the veteran rock fighter, James Kirk. Mr. Kirk says when they start things there will be $200,000 gold in the bank to back the deal.

The ledge on this claim is very wide and runs from 10 to 35 per cent. in the red metal, besides considerable silver and gold. Somewhat over 1,000 feet of work has been done on the property, including tunnels, shafts, drifting, etc. The ore is a black looking sulphide.

Apart from the properties mentioned, Mr. Richardson has many other claims in the Patagonia district bonded to various parties. The owner of the Three Rs has the utmost confidence in the country and is spending both time and money to develop it; and his judgment is good, for the great mass of evidence presented proves that the yellow, white, red and black metals exist in unmeasured quantities in the mesas and mountains of Patagonia.

The Duquesne—This proposition belongs to the Westinghouse people. They have worlds of copper of high grade, but as it seems to your correspondent the management is not all that it might be.

The World's Fair—This is not a mine, but a bank, and is located in the Hardshaw district. The property belongs to Frank and Josephine Powers, and no one knows the amount of cash that has been taken out of it. The ore is mainly silver, running all the way from $1,000 to $10,000 a ton. Mr. Powers keeps one shift of men only at work, and when he wants a few thousand dollars for pocket money he ships a carload or two. The mine is fabulously rich.

The Mowry mine is an old and historic one. Its history deserves more than passing notice and will be made the subject of an article at a later date.

At the Morning Glory about ten tons of ore are being hauled daily to Patagonia and shipped for treatment. This mine is a first-class low-grade copper proposition and it is being well handled by Brown & Wilson, who have a bond and lease of it.

The old Hermoso mine is not working. The ore is principally silver and it is estimated that more than $2,000,000 have been taken out of it. The mine is about a mile from Hardshaw.

The Blue Nose mine, in the same vicinity, is owned by the Hon. R. R. Richardson and is considered one of the richest propositions in the country. It has produced a large amount of valuable shipping ore. The mine is not working, owing to some difficulty with the men who hold a bond and lease on it.

Much more might be said and written about the Patagonia country, but the foregoing is sufficient to show that it is destined to become a great mining center, for untold wealth rests untouched in the bosom of Mother Earth in that region.

Molybdenite, in composition, is sulphur, 40%; molybdenum, 60%. It occurs in small, black scales, having a bright, metallic lustre. The thumb nail readily scratches it and it makes a bluish-gray streak on paper. It is a much heavier mineral than graphite. It is found in many places, though never in great quantity. It occurs in embedded masses, and scales in granite, gneiss, syenite, schists and often in quartz. In Canada it has been found in a bed of quartz in nodular form, from 1 to 4 inches in diameter, and in flakes that measured as high as a foot broad by ¼ inch in thickness, and making, doubtless, the largest and finest specimens of the mineral ever found. It also occurs as a constituent of wolframite, molybdate of lead. The uses of molybdenite are mostly in preparation of molybdates for laboratory work. The metal molybdenum is used to a small extent in certain steels, and its value is uncertain.

Mining News from the Many Camps

ARIZONA

Phoenix—That Arizona has the two best rock drillers in the country was demonstrated at Butte, Montana, when Jack McIver and his husky partner, Jim Pickens, formerly of Bisbee, but now of Globe, defeated all the teams in the double-handed contest that was the feature of the annual observation of Miners' Day in the big Montana copper camp.

Florence—The Vekol mine, situated near Casa Grande, in this county, one of the historic mines of Arizona, has been purchased from the estate of John D. Walker by E. S. Garrett and a company of Alabama capitalists. A first payment of $10,000 was made by the purchasers. It is understood that the total purchase price will be $250,000.

The Vekol mine is a copper and silver proposition, which was worked as a silver mine a quarter of a century ago. A large force of men will immediately be put to work developing the property.

Tucson—The Mineral Hill Consolidated people are usually reticent about their affairs, but Messrs. O'Brien and Collins are here to confirm the report that has gained circuation regarding the recent strike.

The Mineral Hill Consolidated is down 320 feet on the shaft, from which 560 feet of drifting has been done. The management has been looking for something of the kind they have found at 560 feet from the 320-foot level. Recently they came into the formation which they believe is continuous and they propose to continue working through the ore, which is black oxide and which runs from 50 to 60 per cent.

J. H. Gould, owner of the Gould copper mines, west of the city, is endeavoring to secure a sufficient number of teams to haul ore from his mine to this city, where it can be shipped to the nearest smelter.

It is the opinion of a number of local mining men that Mr. Gould is the possessor of a very valuable property and that when it is developed on a larger scale will become one of the territory's best copper mines.

Any quantity of rich copper ore is in sight and Mr. Gould would like to ship a carload, about thirty tons, of ore a day from his claims, but owing to the lack of teams at this time it is impossible to do so.

Prescott—Tyron & Brain, wealthy Los Angeles contractors, have completed with A. Popkess of Mayer, Yavapai county, the details of one of the most important mining deals consummated there in months. They arranged for the first cash payment on the purchase price of $100,000 for the Star group of mines in the Mayer district. Less than one year ago Popkess secured the group of ten claims for $2,500 and paid the entire amount from receipts of ore taken from the grass-root workings of one of the claims. By his sale of the property to the Los Angeles financiers, Popkess obtains forty times the price he paid for the group.

Reports from Chapparel indicate that although the Little Jessie mine has a record in gold production of over three-quarters of a million, its richest mineral bearing vein has not yet been exploited. Recent developments in the crosscut from the 250-foot level uncovered an eighteen-inch paystreak carrying gold values averaging $112 to the ton. The vein is a parallel one to the ledge that has been exploited to a depth of nearly 700 feet and lying about 50 feet from it is the dyke. Its existence was discovered only a short time ago, when John S. Jones, president and general manager of the concern, found it in the crosscut run into the dyke for the purpose of establishing the fact whether there were not other ore streaks in the dyke that could be worked at a profit. A drift is now being run along the paystreak from the crosscut.

A corporation has been organized to develop a placer mine in the Hassayampa district. Articles were filed in the office of the county recorder with a capital stock of $2,500,000 and the par value of each share to be $100. The incorporators are W. A. Bondurant, W. G. Douglas, F. P. Casey and Albert Jones. These gentlemen have just returned from an inspection trip to the mining district recently and a deal was practically finished by which the company becomes the owner of upwards of twenty claims about three miles northeast of Wagoner.

R. M. Carpenter came in recently from the Independence mine, in the Hassayampa district, with a bar of gold bullion, representing a week's run of the seven-ton mill and cyanide plant on the property. Value of the bullion was not stated, but it is known that the mill returns of the past few months since the plant was started paid all running expenses of the mine and mill, besides the first cost of the machinery.

The Independence group of three claims is located about thirteen miles south of this city, in the Hassayampa district. The principal development is two tunnels, which are connected by a raise, exposing an ore body continuous for several hundred feet, and so easily mined that two miners can keep the present plant in constant operation.

Reports from the Parker group of mines, located in the Turkey Creek district, are to the effect that the work of grading for the new concentrating plant is now almost finished, and the tanks and other machinery are expected on the ground soon. Some of the tanks, which have already been finished by the Arizona Mine Supply Company, have been shipped to the camp and others will be forwarded as soon as constructed. The plant will consist of four working tanks and ten solution tanks. There is a five-stamp mill and concentrator in operation and the cyanide plant will be a valuable addition to it, as mill men acquainted with the mines are authority for the statement that the ores are well adapted to the cyanide method of treatment.

Since the arrival of the last car of machinery at the Verde Grande shaft, work has progressed rapidly in installing it. The last piece of the heavy machinery is in position under shelter, the substantial power house having been completed, and soon the plant will be in operation and sinking resumed in the shaft. Considering the substantial character of the machinery and buildings, and the convenience of their arrangement, there is no better equipped company outside of the big United Verde plant, in the district. The machinery is capable of driving the shaft much below the 1,000-foot level as at first contemplated, and as it is the intention to put on three shifts of miners, rapid sinking may be expected in the shaft. The last round of shots in the shaft, over a month ago, when work in it was closed down to make room for incoming machinery, brought up more sulphides than any previous shots, and the more rapid progress which will be made with the new machinery will be watched with keen interest.

Bisbee—The Superior & Pittsburg is about to profit from its enormous outlay for development and construction work for the past two years, while in the fact that all of its shafts are now commanding the ore bodies is assurance that immediate returns in the shape of broadened reserves will attend future underground expenditures.

The fifth furnace of the Calumet & Arizona is complete in every respect and went into commission September

ist, in the treatment of Superior & Pittsburg ores, when the monthly output of the latter will be increased from 1,000,000 to 1,500,000 pounds, which will probably reflect a normal scale of operations until the sixth furnace is in readiness.

The great bulk of the Superior & Pittsburg output has thus far come from the Cole shaft, opened to the 1,450-foot level, at which depth, the greatest thus far attained in the Bisbee district, drifting has just been commenced.

It is understood from personal statements from President Hoffman of the Democrata Mining Company that as soon as the site for the new Greene smelter is chosen definitely the Democrata will find ground in the immediate vicinity for the erection of a plant which will be adequate to its requirements.

The Democrata may, in this connection, be conservatively stated to be a bigger mine than the Calumet & Arizona, an announcement which is based upon authorities of excellent standing. The property is held by a close corporation, and has no stock in the market. Principal among the holders are President Hoffman and Manager Peter Hook, the latter widely known in the Southwest as a mining man, having for some years operated in Bisbee and other districts of the Southwest.

Kingman—A fifteen-horse power gasoline hoister was shipped to the Idaho mine, at Cerbat, recently. It will be placed on the mine at once and active development of the property will soon be under way. John Boyle, Jr., is to push development on this property as fast as possible and intends to put in a magnetic separator for the purpose of handling the ores at the Vanderbilt mill. The ore is heavy in zinc and this metal will be separated from the other metals and gangue and the product shipped to the Missouri smelters. The gold and silver in the ore will be extracted by another process. Owing to the magnetic character of the iron in the ores, a roaster will be put in to magnetize the iron and put the pulp in shape to be handled by the magnetic machines. The plant will be capable of handling about thirty tons of ore daily.

The Adit drift, on the Banner group of mines, at Stockton Hill, has been run on the vein 2,300 feet on a continuous ore shoot. At no place in that distance has the ore cut entirely out, although in spots it has been somewhat lean. This is, we believe, the longest ore shoot ever opened in any mine in the world. The superintendent of the property believes that the shoot continues 1,000 feet further, as ore has been found that distance on the surface. A shaft is to be put down to a depth of several hundred feet and the vein will be thoroughly exploited at that depth. Those who have worked in the mine believe it is one of the richest properties in the territory.

The Arizona-Mexican Mining & Smelting Company is tearing out the old machinery in its mills at Stockton Hill and will soon put in a complete Huntington mill. While good concentrates were made in the old plant, delays were many and annoying. The new plant, it is believed, will meet all requirements of the mine.

Clifton—The Clifton Gold & Copper Company has been launched into this district, with a great deal of vim and energy, and things are beginning to move around their property. Manager Rosecrans is spending his time at the claims arranging matters. A windlass has been erected on the Oregon shaft and about eight men are now at work on the property. The company will devote considerable attention to the copper claim, the Oregon, from which some handsome assays have recently been taken. Indications are good for a good body of copper ore with depth. Some good gold leads have been located on claims owned by this company, which are near the old Dick Marshall gold claim, from which a considerable amount of rich gold ore has been extracted and shipped, netting handsome returns.

Kelvin—W. E. Sharpe, president of the Kelvin-Calumet Copper Company, and Thomas Smith, a stockholder in the same, returned recently from a trip to the Ray and Kelvin country and were very enthusiastic about the prospects of that mining section. The company is planning to increase the capacity of the plant at the mine in the fall.

Mr. Smith said that the outlook was never better, and in less than five years he believes the camp will be a second Bisbee. The amount taken out in eight months from the Calumet claim, the remaining half interest of which was recently purchased by the company, was over $112,000 in good shipping ore.

COLORADO

CHAFFEE COUNTY.

The various districts of this county appear to be holding their own or better, including the number of men employed, development, equipment and output. At Turret, Monarch, Sedalia, St. Elmo, Smelterville and several other points, all hands are busy and more could be employed to advantage were they to be had.

The large smelter near Salida is in operation day and night up to capacity, and is one of the most extensive and best smelting plants in the state. Its capacity is about 800 tons in 24 hours and it gives employment to 350 men. Its ore comes chiefly from Leadville, but scores of other camps throughout the Rocky Mountains contribute more or less.

Miners from Turret report that camp quite active. It is understood the Vivandiere, that has been idle for several months, is to resume operations in the near future.

Additional development, equipment and other improvements will be put on and the owners will see what there is in the property.

Steady operations are in progress both on the Saint Paul and Fourth of July properties and the results are quite satisfactory. Work will probably be pushed there all winter and another season they are confident both of them will become shipping mines.

The Turret Gold Belt states that M. H. Zook has the Copper Commander under bond and lease and is doing some first class development work preparatory to steady shipments. This property carries very high grade copper ore, which is found in bunches in white quartz. It is believed that the quantity will be sufficient to make profitable mining. The depth thus far gained is comparatively shallow and the excellent showing makes the property most promising. Mr. Zook is to be congratulated on his good fortune in securing the property.

Robert Denham and associates are doing the annual work on the Gold and Globe properties in Fleming gulch about a mile south of Turret. This is one of the first properties located in the Turret district. It has thus far been developed by tunnel in several hundred feet. The development shows it to be a milling proposition of high rank. Besides the regular mineral locations the ground is covered by a 3,000-foot tunnel site. The maximum depth to be reached is about 2,000 feet. Immediately at the mouth of the tunnel there is an ample supply of water for milling.

The station at the 500-foot level of the Gold Bug is being cut. The developments at that point are very encouraging. The dike which lies on the north side of the vein and between the vein and the shaft is quite heavily mineralized and shows free copper scattered through it. One streak of ore has appeared in the shaft which is evidently a stringer from the main

vein. It is several inches wide and carries values of about $100. As soon as the station is completed a crosscut will be driven through the dike to the vein. Ore may be encountered at once or it may be necessary to drift 50 or 60 feet each way, as in the 400-foot level.

A wonderful strike of rich ore in Baldwin gulch on Red mountain opposite the Homestake mine was recently made by George McCulloch, an old prospector from the Black Hills. Mr. McCulloch has opened up a property on Red mountain showing an abundance of lead and copper, the lead running as high as 66% and carrying good silver values.

The ore shoot is 50 feet wide and about 300 feet in length. The owner can commence shipments at once from the surface. The strike is close to the Homestake wagon road and only three miles from the railroad at Alpine.

CLEAR CREEK COUNTY.

In the Vidler tunnel that is piercing the Continental Divide above Georgetown, it is reported there are more than one million dollars' worth of ore in sight. The tunnel has reached a distance of about 3,700 feet and less than 4,000 feet more will let daylight through, thus connecting Clear Creek and Summit counties by this subterranean highway. It is said when that part of the work is completed a company will begin enlarging for a standard gauge railway.

In all probability it will become a connecting link for a great trunk line from Denver to the Pacific coast. It is a splendid enterprise, a remarkable feat of engineering, and it is said will produce ore enough to more than pay for the great work.

The Stevens mine and mill have been leased to J. B. Warner of the Nashota Mining Company of Silver Plume. Mr. Warner is an old-time San Juan miner, and he built for his company the 200-ton Nashota mill at Silver Plume last season.

The Georgetown Courier says Mr. Warner put a force of men at work on the Stevens property last week and it is being put in the best possible shape for continuous operation.

Filtering dams are to be constructed in order to insure the town of Silver Plume an abundance of pure water. The water used in running the mill is to be used over and over again, thus keeping the tailings from escaping to the stream to as great an extent as possible. With the Stevens again undergoing development the output from the upper Clear Creek district will be materially increased. A considerable amount of development is to be carried forward throughout the workings and no doubt new ore bodies will be found. The mill has a capacity for treating 125 tons daily, and as there is enough dump matter to insure the running of the machinery for a period of five years the output promises to be heavy.

The East Argentine and Peru districts are enjoying great prosperity. Prospectors and operators are hurrying to those fields and as a result more activity is noticeable than at any time in many years. Over at Montezuma a number of strong companies are at work and large capital has been pledged for carrying forward energetic campaign of development. Miners are in demand in all three sections with top wages prevailing. One operator was searching for fifteen miners a couple of weeks ago, and offered to pay $2.50 per day and board. Within another year East Argentine, Peru and Montezuma will become recognized as the richest mineral sections in the West.

Work was put under way last week upon the Duncan mine, situated on Brown mountain. The workings are being cleaned out and retimbered, after which the crosscut will be advanced in order to intersect the Duncan vein at a much greater depth. In the upper workings a considerable amount of high grade ore was extracted a number of years ago and there is reason to believe that the ore shoot will be found to be continuous. This property was recently secured by J. H. Crawford and Owen Williams of Silver Plume. They have interested a number of Kansas City men in the enterprise and funds have been provided for the carrying of all plans to a successful issue.

It is expected that within another thirty days the crosscut being run to intersect the Glendower vein will have reached the objective. The ground is becoming somewhat softer and considerable scattered mineral has been in evidence for some time. With the cutting of the vein it is expected that ore in paying quantities will be found as the heading will cut directly under the old workings, whence a heavy production was made a number of years ago. Ore has been produced from the Glendower, which milled as high as 1,800 ounces in silver to the ton.

Contractor James Bowen, who has been driving the crosscut from the Scepter tunnel to intersect the Astor vein, is making good headway and the objective would be reached within the next few feet. The heading will cut under the ground being operated by Butts & Co. at an increased depth of 500 feet and it would be no surprise to learn that the ore shoot had been found to be continuous. Operations are being prosecuted 2,700 feet from the portal of the tunnel.

Work in the driving of the Lincoln crosscut on Lincoln mountain, continues unabated. The bore is now in over 825 feet and progress is being made at the rate of twenty-five or thirty feet per month. It is hoped early the coming year to intersect the Virginia City vein, cutting under the 500-foot level of the shaft workings. At that time the mine will be drained of its large bodies of water, thus permitting the exploitation of a large area of ground at a most economical cost.

Considerable ore of high grade is being extracted from the block of ground being operated by Edward Butts & Co. on the Astor. Blind drifting has been put under way and the ground is being opened with all possible speed. The streak measures from four to eight inches in width and assay tests show values running up into the thousands. It is expected to get down another shipment in the course of a few days, and as soon as the ground has been opened to permit of stoping regular shipments will be maintained.

A shipment was made last week from the Stemwinder, which is being operated under lease by G. J. Hite. This operator is running a drift on a streak of ore which measures from four to six inches across and from mill runs it has been found that average returns of 325 ounces in silver to the ton are contained. The ore is a sulphuret, and as a result great care must be exercised in handling the product for the saving of the highest values. As soon as the ground has been opened for twenty-five additional feet stoping will be inaugurated.

Manager Michael Kelly is employing a force of men in development on the Maud S., situated on Douglass mountain. The old workings have been cleaned out and retimbered and now a drift is being run on a streak of ore that measures from six to ten inches in width. The ore is of a high grade carrying high values in both gold and silver and indications are that a rich pocket of ore is about to be uncovered. It is the intention of the operator to shortly start work in driving the crosscut which was started a number of years ago. Within a comparative short distance the heading would cut under the old shaft workings at a greatly increased depth, thus permitting the exploitation of a vast area of mineral-bearing ground.

A big campaign of development was inaugurated last week upon the holdings of the Democrat Mountain Mining Company. A force of twenty-five men

is now employed and effort is to be made to send forth a heavy tonnage of ore. Drifting is in progress upon a number of lodes intersected through the Moline tunnel, and in addition to the supplying of the concentrating plant with plenty of material, it is hoped to maintain regular shipments of smelting ore. The aerial tramway is now in good working order, while the mill is being run both day and night. Shipments of concentrates are to be inaugurated in the course of a few days. A regrind was recently installed at the plant and as a result a much better saving of values will be made.

The Mint group of thirteen claims situated on McClellan mountain has been taken over by the Mt. McClellan Mining Company, and already work has been put under way. A trail running from the Indiana dump to the portal of the Scott tunnel has just been constructed, to allow of supplies being taken in at low cost. The task of driving the Scott tunnel is to be rushed as fast as possible. The bore is now in a distance of 750 feet and according to surveys it will be necessary to drive 700 feet more before the Mint vein is intersected. A depth of 700 feet will be attained and in view of the fact that the surface showing is unusually strong it is believed that important discoveries will be made. From a shaft sunk to the depth of 120 feet a production of $20,000 was made a number of years ago. The Mint vein is a large one on surface, and is believed to be the mother lode of the McClellan mountain section. It can be traced for thousands of feet, and it would seem that in due time the property will be entered among the list of steady producers of the Upper Clear Creek district. The property was owned by J. U. Harris, a former resident of this section, but who now resides at Grand Junction. The company is being financed by Pennsylvania capitalists, while John Wright has been appointed general manager. Mr. Wright's home is at Grand Junction, but he is an experienced mining man, having had large experience in many of the western states.

The West-Phillips drift, which has been run to intersect the Seven-Thirty vein, is believed to have reached the objective. A vein has been encountered and a large amount of water is flowing, but it will not be possible for a few days to determine as to whether the same is the Seven-Thirty or not. According to surveys the heading of the drift has cut directly under the old shaft workings. With this important piece of mining engineering completed the old Seven-Thirty will undoubtedly again proceed to surrender its share of the precious metals. It will now be necessary to carry a raise for 300 feet in order to connect with the upper workings. The Seven-Thirty shaft was sunk to a depth of 700 feet and as an enormous body of water is above, great caution will be necessary. With the work carried to a successful issue a vast area of virgin ground will be opened for exploitation. A block of ground will have been secured which is 300 feet in height by nearly one mile in length, and there is every reason to believe that large bodies of high and medium grade ore will be found.

J. T. Johnson and Carl Anderson of Denver, owners of the Merrimac group of claims, situated on Kelso mountain, have just completed the assessment work upon the property. The crosscut tunnel has been advanced for 170 feet and within the next 100 feet the Merrimac vein will be intersected. From surface development the holdings have been proved to be of great richness. In the shaft on the Merrimac, down to a depth of fifteen feet, a streak of sulphuret ore has been exposed which measures from six to eight inches in width. The ore carries a considerable amount of green carbonates, and it is evident that when the vein is cut through the tunnel workings the shoot will be found to be continuous. The owners contemplate pushing development work during the balance of the year. The Good Hope lode is another promising proposition and from the surface development ore of an unusually high grade has been extracted.

Another strike has just been made in the Ramsdell property situated on Lincoln mountain. In running the east drift, now in a distance of over 350 feet a body of solid smelting ore has been exposed which measures fully two feet in width. For some time past a big body of quartz had been followed which measured from four to six feet in width, while running through the same are a number of feeders of heavy lead ore. While no tests have been made on the streak just uncovered the ore will doubtless carry good values in gold, silver and lead. Drifting is still in progress and a test shipment of a few hundred pounds will be made in the course of a few days.

The Market crosscut tunnel is being driven steadily forward and it is hoped to intersect the Golden Jack lode within from ten to fifteen feet. The Golden Jack is a monster on surface, being larger than is the Ramsdell, and with the great depth that will be attained through the tunnel workings it is confidently expected that important discoveries will be made. The tunnel has now been advanced for 325 feet and it is the intention of Manager George W. Teagarden to continue the bore on into the hill in order to intersect the entire group of six claims. In the west drift on the Ramsdell a body of good grade ore is being followed which measures from three to five feet across, but no attempt is being made to knock down the product. The same is being left standing pending the completion of the new mill.

It has been decided to install four Hathaway mills for the treating of ores found in the Ramsdell workings. In addition to this straight concentration will be followed for the saving of the lead, iron and zinc. The Hathaway mill, it is claimed, will extract the gold and silver values, effecting a saving of from 90 to 95 per cent. A carload of ore was shipped to Denver a few weeks ago and the results obtained were pronounced highly satisfactory. Considerable lumber has been delivered on the ground for the mill building and it is hoped to have sufficient material on hand within a couple of weeks to permit of employing a good force of carpenters.

GUNNISON COUNTY.

The mining outlook of this county was never more promising. Steady progress is evident in every district of the county.

Around Pitkin, Crested Butte, Irwin, Gothic, Marble, Crystal, Tin Cup, Bowerman, Sillsville and other camps there is greater activity than any time the past ten years has shown.

The great marble works, near the town of Marble, in the northern part of the county are in full swing and the beautiful stone is being turned out dressed and polished by the train load. It finds a ready market east as fast as it can be made ready and shipped. A few years hence will see at these quarries the greatest marble works in the world.

In addition to her great variety of metalliferous wealth, Gunnison county is blessed with beautiful crystal streams, alive with trout, extensive grazing ranges, broad valleys rich in the elements of fertility, splendid water powers that will eventually be utilized, mountains of iron awaiting developments, immense coal measures of the anthracite, bituminous and semi-bituminous varieties, fine granite, limestone of different varieties, in addition to her beautiful marble and granite, while brick, fire, potters' clay and gypsum abound.

Gold, silver, copper, lead, zinc, iron and other metalliferous combinations seam her mountains wherever volcanic action has ruptured the rocks. Gunnison county is vastly rich in latent resources, and a few men are just be-

ginning to comprehend her marvelous possibilities.

The Gold Links tunnel, near Ohio City, has struck more water than it bargained for. It has put the miners out of business there and it still continues to hold possession. It is hoped that the fountain will soon be drained and the flood subside. Machinery is arriving for the mill and work will be pushed until the plant is completed.

In the breast of the lower tunnel of the Climax, says the Miner, a property located in Jones' gulch, a vein was recently encountered seven feet from wall to wall. Of this width about one foot will run $60 per ton, while the remainder is a good milling grade. The ore is a sulphide and is similar to that found in the Raymond and Gold Links. It lies between walls of granite and porphyry. The tunnel is in a distance of 825 feet and has a vertical depth of between 400 and 500 feet. The Climax is one of the oldest properties in the gold belt and is giving promise of being one of the best. While penetrating the gold belt in a different direction from any other undertaking, yet it is encountering good ore, showing that the whole territory is interspersed with ore shoots. A milling plant will be installed as soon as ore enough is found to justify it.

More work than usual is going on around Irwin, Gothic, Pittsburg and other camps of the northern part of the county. The Gunnison Champion reports a rich strike by Jonas Ericson, superintendent of the Rustler Gold Mining & Milling Company. He has just opened a fine body of ore carrying gold, silver and copper that runs $60 to $120 a ton. Eighteen to twenty-four inches of it is being sacked and prepared for immediate shipment by the three men employed. This ore is found as a fissure in the lime and is only fifty feet in. On the Wolverine creek side a 480 foot tunnel is headed for the same vein, but as the ore develops it is probable that a much lower tunnel will be driven from Rustler gulch to gain 800 feet in vertical depth. Power can be secured from nearby properties or a separate plant erected. There are five claims in this group, all of which exhibit high grade ore which can be successfully milled. Indeed, a properly designed mill that will handle the low grade product is the ultimate necessity for every large mine. The Rustler company has officers and stockholders largely in Monmouth, Illinois. Mr. Ericson is also superintendent of several other good properties around Gothic and Pittsburg.

The Blaine Mining and Reduction company, officered largely by Cleveland, Ohio, parties, has for some years been developing a group of ten claims on Red mountain, two miles north of Gothic. Numerous short tunnels and shafts have discovered that the mountain is a net work of veins. Seven distinct fissures traverse the quartzite, running up the slope, while five cross veins have so far been opened. These veins appear to be converging like the spokes of a wheel. Captain Archie McLeod, who was the original locator of the Blaine lode and for years in charge of development work, has driven a tunnel 800 feet on this vein. This spring, in stoping, a splendid ore shoot was encountered, which now exhibits eleven feet of solid steel galena. A number of assays give returns of 71 per cent. lead, 22 ounces in silver and $1.60 in gold, or total values of $73.80. Between 500 and 600 tons have been put in bins for shipment. There is 300 feet of vertical back stoping on this shoot to the surface and walls are not yet disclosed. Large quantities of low grade mineral are also opened.

On the Alice claim of this group, where a thirty foot shaft was sunk fifteen years ago, recent development has opened $60 ore and crosscut a nine foot vein. It looks very well indeed, but has not been extensively prospected as yet.

Judge T. K. Dissette of the court of appeals at Cleveland, Ohio, who with Captain McLeod is a principal stockholder in the company, has spent several weeks on the ground and has under way plans for a new tunnel, a power plant, mill, air drills, etc. The present tunnel will be extended and drifts and stopes run to prospect the ore bodies. The new tunnel site is 1,500 feet down the slope, and gives 600 feet more depth. Air drills will be run by a compressor situated at Wolverine creek, a never failing stream, where 300 horse power can easily be secured, on Pelton wheels. This mill site is 4,000 feet from present workings and a tram has been surveyed and will be erected this fall if possible. Judge Dissette has purchased a ten-stamp mill and crushers at Pittsburg from which place C. L. Miller and sons are transferring it on wagons of O. F. Thomas. The sawmill of Levi Lawrence, at Schofield, has also been purchased and will be set up in the vicinity to furnish lumber. The exact process of treating these ores has not yet been determined as tests are being made. The Elmore flotation process is under consideration. It is the intention to have a producing mine in full operation before winter sets in. Two miles of new road just completed to the mine should be mentioned as among important improvements which the energetic management of the Blaine has added to the general development of Gothic.

Speaking of roads leads naturally to the four and a half miles of first class work done by the Elk Mountain Mining and Milling Company, under the management of A. J. Vagg. This road leaves the main route at the East river crossing, leads along the bank of the river to Rustler gulch and from there to the very head of the gulch, above timber line, where an up-to-date mining plant is being erected to develop the Mountain King group.

There are three claims on the vein and three auxiliary claims. The Mountain King was discovered by J. T. Bennett, a pioneer prospector, in the same year as the Sylvanite and he is still interested in the property. The surface showing at the Apex is a vein forty feet wide. On either side it has been developed by tunnels 135 and 240 feet long approaching each other on the vein. On an ore shoot at the Apex an incline has been driven and from this some years ago was shipped eleven tons that returned over 100 ounces silver and ten to fifteen per cent. copper. In the 135 foot tunnel is low grade ore that averages four to five per cent. copper and fifteen ounces silver, but this tunnel also cuts the main ore shoot at its breast where values run to shipping grade across for twelve feet. Other developments point to the Mountain King as an enduring vein going to indefinite depths, with millions of tons of low grade ore as well as much shipping mineral.

At 12,000 to 13,000 feet altitude mining is a proposition that must be economically considered and the best possible methods adopted in the operation of either a large or small mine. For this reason quite a force of men has been put at work excavating for the Mountain King tunnel house, building foundations for the machinery, hauling in winter supplies and similar work. The power house is 36x36 feet, tunnel house 18x50, two stories and other modern conveniences are provided. All the heavy machinery rests on cement foundations, and the equipment consists of two 50 h.p. boilers, Ingersoll-Rand compressor, Leyner drills and much other machinery.

Officers of the company are C. C. Meurisse, president; C. H. Bowles, vice president and secretary; E. J. Harvey, treasurer; W. S. Cutler, W. S. Humphrey, G. A. Gowan and A. E. Bowles, directors; A. J. Vagg, superintendent. All are Chicago capitalists. Messrs. Bowles and Cutler have recently spent some weeks inspecting the property and are enthusiastic over the outlook for making a

mine at the Mountain King within a short time. Work on the new tunnel is scheduled to begin October 1st.

Adjoining the Mountain King, but lower down the hill, are six claims of the Maroon Mountain Mining Company, operated by Reinhard Holloway. The vein is clearly defined and Mr. Holloway states that he has traced it for five miles, across Belleview mountain to East Rock creek, and in the other direction across Maroon mountain toward Aspen. Although generally appearing as a contact between blue lime and porphyry, it has characteristic of a true fissure, sometimes crossing the lime at some distance from porphyry. Although mineralized for 150 feet in width, the main vein is from five to seven feet. There are two ore shoots so far located on the Maroon property, the first being developed by a shaft high up, the second by an incline shaft on the dip of the vein. Here considerable high grade ore was found, running 60 ounces silver, $18 gold and some black oxide of copper, going to 55 per cent. This could be shipped, but is held awaiting more economic handling.

Mr. Holloway has been running a tunnel to catch this ore shoot at considerable depth. It is in 650 feet, having crosscut two smaller veins carrying low grade ore. He drifted 167 feet on the first vein and then crosscut to the main contact. This was struck at a lean place, but drifting north the ore is coming in and at another fifty feet Mr. Holloway believes he will be under the right spot and have a pay mine. S. F. Ellen of Monmouth, Illinois, is president of the company and F. C. Tapping of the same place is treasurer. Mr. Holloway has spent many years in developing Rustler gulch and deserves the success which seems to be in sight.

In 1879 the discovery of the Sylvanite mine on Copper creek set prospectors wild and with the spring of 1880 shipments of thousand dollar ore from its fabulously rich ore shoot boomed mining in this part of the Elk Mountains and laid foundations for the town of Gothic. But here, as at other points, after extracting hundreds of thousands in values from 450 feet on the ore shoot, water made mining difficult, and it has since laid idle largely under the preposterous assumption that the mine was worked out. Preposterous, we say, because no mine on a true fissure or contact has begun to be developed at three or four hundred feet in vertical depth, and because deep mining all over Gunnison county is proving that our mineral deposits are among the most substantial and continuous in the world.

That the Sylvanite will shortly witness a renewal of its palmy days is highly probable, for contracts are to be let that will carry on the lower tunnel, but the future of Gothic is not dependent upon it since several strong companies have taken hold of fine mining prospects nearby and are doing development work on a large scale.

There are in this vicinity many patented properties which have long lain idle and which will undoubtedly soon feel the effect of successful mining and be worked either by the owners or by lessees. Among them are the original Rustler claim, lying parallel to the Ericson property and with end lines near the Sylvanite. It is now owned by John Gordon of Gunnison. The Virginia mine shipped $7,000 worth of ore as late as 1900 and has been but slightly developed.

PITKIN COUNTY.

Aspen Correspondence.

Very little is said in the public press about our district and the county in general. We think the district eminently worthy of notice, although we are not trying to advertise ourselves. We are mining right along for the money there is in the business. Our people are close-mouthed and are not for sale. They sell their ore for a fair price, make money out of it and go on about their business.

Mining in all the camps of the county is active, and around Aspen and several other camps more so than usual. All the good miners are employed and some that are not so good. Generally speaking, we are short of good practical miners.

The Montezuma group of mines, in the Columbia district, is unusually active. A fifty-ton mill is being put up there and forty-five or fifty men are at work on mine and mill. Other properties in the neighborhood are pushing ahead commendably.

A number of properties in the Highland district are in active operation, among them the Little Annie, Eva Bell, Hanlon, Azurite tunnel, Famous tunnel and others.

The L. & N. Mining & Milling Company is doing a lot of good work on its property located on Castle Peak mountain in the Columbia district, about five and one-half miles west of Ashcroft and sixteen miles southwest of Aspen. The company's officers are:

C. G. Smith, president and manager.

C. W. Evans, vice president and treasurer.

E. H. Thiesing, secretary.

L. L. Stephens, assistant secretary, Pierre, South Dakota.

Directors:

Charles W. Evans (Evans Steel & Iron Company), 12 East Front street, Cincinnati, Ohio.

E. H. Thiesing, pharmacist, Gilbert and Lincoln avenue, Cincinnati, Ohio.

J. F. Cronin, marble and granite, 2305 Gilbert avenue, Cincinnati, Ohio.

Jacob Strickmire, 3044 Reading road, Cincinnati, Ohio.

H. U. Moore, pharmacist, 3048 Reading road, Cincinnati, Ohio.

John E. Fitzpatrick, attorney-at-law, 35-36 Wiggins block, Cincinnati, Ohio.

Robert A. Martin, salesman, Norwood, Ohio.

L. C. Hamer, real estate, 312 First National Bank building, Cincinnati, Ohio.

Charles G. Smith, locater of mine, manager and superintendent, Aspen, Colorado.

The main tunnel will intersect the large vein in about 225 feet, 400 feet vertically beneath surface. This property is a true fissure and is looked upon as the mother vein of the entire district. The tunnel, which is being driven into this mammoth vein is the key to the Castle Peak mountain and to all the cross veins. The character of the rock formation already penetrated in driving the tunnel and the mineral outcrop and float on the surface of the mountain overlying the tunnel location, and running at right angles thereto as well as the actual working of the vein indicate the presence of ore of great value at no great distance in front of the present breast of the tunnel.

There is a wagon road to Aspen, a distance of sixteen miles, and in addition a railroad is to be built soon, which will run within three and one-half miles of the Nashville mine, known as the Aspen & Buena Vista Short Line. There are two public samplers at Aspen, which buy ore at all times of the year and pay the market price for it in lots from 500 pounds to 500 tons.

The ore so far as tested assays in gold, $4.12; silver, $18.24; lead, $30.25; copper, $15.84. Total value, $68.45 per ton.

The formation of this district is trachite, granite, porphyry and iron. The two latter form the gangue or the formation between the walls of the vein. The foot and hanging walls of the vein are trachite or country rock. Overlying the granite, the vein shows an average on surface of thirty-five feet between walls for 1,000 feet on veins. The dip of this vein is about 45 degrees from the vertical. Course of vein, from northwest to southeast.

ROUTT COUNTY.

A mining man just in from Routt county says large tracts of mineral, timber, agricultural and grazing lands have been taken up there this season, and at least 3,000 people have become permanent settlers in the county since the Moffat road began its work on that slope of the continent. Scores of homeseekers have been looking over the 50,000 acre tract that was thrown open to settlement under the Carey act September 5th. This land is an irrigated body in the Little Snake river valley from one to six or seven miles wide and extends from a point below Baggs, Wyoming, to Lay, Colorado, on the Colorado and Wyoming line. The upper end of the tract is sixty miles from Rawlins, Wyoming, and the lower part is from fifteen to twenty miles from the proposed line of the Moffat road.

The trip to the Little Snake river valley will have to be made at present through Wyoming. An automobile stage line has been established by the Routt County Development Company, and automobiles can be taken at either Rawlins or Wamsutter, Wyoming. Commissioner Warren Given of the company says that the old freight road from Wamsutter to Baggs has been improved. The sage brush has been cut out and the road surfaced with sand. Stringers, which are just wide enough for the wheels of automobiles, have been built across gullies. This prevents the freight wagons from using them. Six autos will make daily trips as long as the rush to the land continues, says Mr. Given. A similar line from Lay, Colorado, to the Little Snake river valley is proposed, and will be built as soon as the Moffat line reaches Lay.

Tracts of 40, 80, 120 or 160 acres will be sold under the Carey act to citizens of the United States. These tracts can be secured by the payment of 50 cents an acre to the state and the purchase of water rights from the Routt County Development Company. The price of the water rights has been fixed by the state at $25 an acre, one-fifth of which, or $5 an acre, is to be paid down, the balance to run a term of years at 6% interest. One-half of the 50 cents due the state is to be paid when the selection of the land is filed with the state land board, and the remainder when one-eighth of the land has been reclaimed and patent applied for.

Much of this land is said to be rich in mineral—gold, silver, lead, copper, zinc and iron. Coal is found in place, timber abounds, great water powers, agricultural and grazing lands, choice building stone, fire brick and potters' clays, excellent limestone and many other treasures of the earth that help to make an industrious and thrifty people self-sustaining and independent. Routt county is a vast region of latent resources, rich in the natural elements of production, inviting settlement and development.

SUMMIT COUNTY.

Breckenridge, Colo. — The Sallie Barber operated by Mr. Putner and company are taking a very good grade of ore at present from the bottom of the shaft that runs from thirty to forty per cent zinc, the ore is concentrated in the vein so there is no expense of sorting. The management is well pleased with the present outlook of the property contracts having already been made to the amount of several thousand tons.

The Montezuma district is doing more sound development at the present time than has been done for some time. All work done tends to bring the cost of mining down to a more economical basis. Power companies and railroads are doing a great deal to bring the conditions to pass.

The Swandyke Gold Mining Company, operating at Swandyke, has lately put a number of miners at work. This property would have been a good producer long before this if it had had the proper management. Dr. W. E. Stone of Denver is the present manager.

Considerable ore of a good grade is being opened at Frisco. The Summit Company has a streak two feet wide of ore that will run $78 in gold and silver and thirty per cent lead. This company is working the Mary Verner property.

MEXICO

Recent reports from the Compania Carbonera de San Blas, one of the latest coal enterprises in the state of Coahuila, are to the effect that the extent of the company's coal land is at least 16,000 meters in length by 6,000 meters in width, or over 2,200 acres of surface.

The estimates of the quantity of commercial coal are at the least 15,000,000 tons. As the excavation and development proceed, the quality of the coal gives indications of improvement, and the explorations are pushed with activity.

The company's capital is represented by 5,000 assessable shares of $100 each, par value, on which $20 has been paid, and they are held in the market at $105; by another 5,000 unassessable shares bearing the nominal par value of $100 each, held in the market at $180 for cash, and sold last week at $190 for delivery on November 20, 1907.

La Perla mines, in the Topia district of Durango, near the Sinaloa district have recently been sold to M. E. MacDonald, formerly general manager of the Guanajuato Consolidated Mining & Milling Company, and his brothers, Bernard and Joseph MacDonald, the consideration being $300,000. It is estimated that the ore now in sight will return a total of $2,000,000. The MacDonald brothers have also taken over the San Cristobal mine in Zacatecas and intend to work it for their own account.

Ore running better than $1,600 to the ton across a meter vein was encountered on the 80-foot level of the Duende mine in the Ocotlan district recently, high silver sulphide and wire silver, said to carry better values than any ore ever taken from the Taviche camp, form a foot of the vein. El Duende two months ago was taken over by Sam Crowther of San Angelo, Texas; Ira Z. Mason and W. J. Chalkley. The former owner, Mr. Robert, during the time he worked the mine, extracted a fortune from El Duende.

The Cananea Herald says the United States Mining, Smelting and Refining Company is doing a great work in the old Real Del Monte group of mines, in the historic district of Pachuca, capital city of the state of Hidalgo; and it is doing this work and making heavy investments in a very quiet and unostentatious way.

The mines of Pachuca and those of Tasco are considered the oldest in Mexico, some of them having been worked by the Aztecs at the time of the arrival of the Spaniards, who commenced to exploit them in 1523, and they have been constantly worked and yielded silver during 338 years. It was in Pachuca that the process of amalgamation called the patio process, for the reduction of silver ores, was discovered by Bartolome Medina, a monk in 1557. The hacienda, or reduction works where this discovery was made, are still to be seen in the city of Pachuca. And although millions of silver pesos have been taken from the Pachuca mines, the hills show clearly that the veins have been only scratched, and still contain thousands of millions awaiting extraction.

Very many years ago, the Real del Monte Mining Company was formed to work a group of mines within certain limits known as Real del Monte. It was a purely Mexican organization, and large amounts of silver were extracted, contributing the greater part of the weekly output of $500,000 of the Pachuca district for many years. It

was in this time one of the gilt edged mining concerns of Mexico. The United States Mining, Smelting and Refining Company acquired the majority of the stock, and is now transforming the old works and mining system of the Real del Monte into the modern system run by electric plants, which, in view of present conditions will raise the silver yield far above anything the past has ever known in this historic and famous mining district, which is admitted to be one of the greatest in Mexico. The name of Real del Monte is still continued, though it is owned by the great American company.

Among the improvements effected by the American company are the following: The old reduction works, known as the Loreto mill operated on the old patio process in the city of Pachuca, has been remodeled, and is now a modern cyanide plant, with forty stamps, and over forty Chilian mills for crushing the ores. It has a capacity of 2,500 tons daily.

At the point known as Guerrero, the company is building a duplicate plant of the Loreto cyanide mill. At the same time electric aerial lines and tramways are being built in various directions to connect the company's mines directly with the Guerrero mill. All will be completed simultaneously.

The company has contracted with the Campania Electrica e Irrigadora de Hidalgo of Pachuca to furnish 5,000 horsepower for the operation of the new works. This electric company is one of the Pachuca regular dividend payers.

The principal mines in production in the Real del Monte group are the Escobar, Babrera, Dificultad, San Ignacio, Carretera, Dolores and Sacramento. In the Pachuca group are the Corteza, Porvenir, Cabana, all of which are on the Corteza vein, considered a mother lode; also the Baron Camelia, Bartolome de Medina, named after the discoverer of the patio process, the San Juan, Rosario and Paraiso.

When the United States Mining, Smelting and Refining Company obtained control it practically suspended the extraction of ores, pending the construction of the new plants, and the general preparation for working on an extensive scale. In doing this the company has taken into the Pachuca district thousands of tons of machinery for mining works, for milling, pumps, electric hoists, aerial lines, cyanide plants, etc., in fact all classes of modern mining machinery have been purchased.

The works, both of construction and exploitation, are carried on extensively and actively, but very quietly. The weekly payroll amounts to $54,000, supplied by the chartered Banco de Hidalgo, of Pachuca, and everything is running smoothly and satisfactorily. The general manager of the immense works is E. P. Merrill.

The Nuevo Rosario Mining Company has been organized in Guadalajara recently, a holding concern for the Rosario Mining company of the United States, a corporation formed in 1905 to take over, reopen and work the Rosario, Condesa, Zuloaga and Providencia mines in the Balonos district of Jalisco. The formation of the holding company is a step in a proposed active campaign of development in that particular section of Jalisco. Some work has been done by the Rosario company during the last two years, but from now on operations will be conducted on a more extensive scale. Dr. J. H. Spens, who came from Sonora several weeks ago, has been appointed general manager of the company, and will within a few days go to the Bolanos district to take charge of the company's work.

The Rosario Mining Company has a capital of $1,500,000, gold. George J. Atkins of Lancaster, Pennsylvania, is president; Independence Grove, of Guadalajara, vice president, and F. C. Rutan of Chicago, secretary and treasurer. The directors are Louis Rosenfield of Chicago and John A. Mouk and George R. Heisay of Lancaster Pennsylvania.

The mines owned by the Rosario Mining Company were secured by Independence Grove of Guadalajara more than two years ago. They are Spanish "antiguas," and church and other records show that they are great producers. The old workings of the Zulaoga, particularly, are very extensive, and it is estimated that the milling ore now in sight in this property is sufficient to keep a big reduction plant going for several years. A prospect tunnel, which was started on the Zuiaoga claim soon after the property was acquired by the company and driven for a distance of 700 feet, will now be abandoned and a new tunnel will be started. This tunnel will be about 2,000 feet long and will cut the Zuloaga at a depth of 1,000 feet, a considerable distance below the old workings. A tunnel driven into the Rosario claim for a distance of 200 feet will be continued. As in the Zuloaga claim, this tunnel will cut the vein below the old workings.

The Rosario people plan to erect a very complete concentrating plant near the mines, but it is probable that work on this plant will not be started inside of a year. It is announced that instead of concentrating tables the Waterby magnetic separator will be used. This is a late electrical invention, control of which has been secured by George A. Atkins, president of the Rosario company, and A. E. Nusbaum, a capitalist of Chicago. It is claimed that the Waterby invention will revolutionize the concentration of all ores. For power it is proposed to use electricity generated by charcoal gas producing engines

A special commission consisting of Prof. A. Hoffman, for many years connected with the technical work of the American Smelting and Refining Company, and his son, and Messrs. Horner, Young and W. O. Titus of New York, are at present in Topia, Durango, investigating the available ore supply, the necessities of railway connection and transportation to Tepehuances, the present end of track of the Mexican International Railway, north of Durango.

Prof. Hoffman has been called in by the extensive mining interests of Topia, to decide on the best method for the extraction of values from the ores of that camp which runs from one to three kilos silver to the ton and carrying some gold and lead. His study will be extensive and the Monterey News is reliably informed that the treatment recommended by him will be adopted by the large mining companies of Topia.

It is reported that the Rogers-Ryan interests in New York are heavily interested in this camp and have sent Professor Hoffman and Mr. Titus to the district to study out the best methods to be pursued in the opening up of the same on an immense scale. The party left Tepehuances ten days ago for the mines and will probably return the latter part of this month. It is a 10 -mile ride, horseback, from Tepehuances, with poor accommodations along the route.

W. O. Titus has just returned from South America, where he has completed arrangements for the construction of several important lines of communication in Chili. The district in which this commission is working is a very old one, many of the mines having been constant shippers for over 200 years. Only the high grade ores, from the regular run of ore from the mines has been available for shipment. The camp has records of many carload shipments which net from $20,000 to $50,000.

According to information emanating from railway officials a definite decision has been reached by the Mexican International engineers and the company has decided to begin the construction of the new railroad from Durango to Mazatlan on the Pacific coast, the entire distance being about 385 kilometers. While the road will be a most expensive one, and call for an unusual display of engineering skill, the line

is said to be feasible and will prove a very useful and profitable extension of the International system.

The Durango-Mazatlan extension of the Merger system will connect with the Guaymas-Guadalajara extension of the Southern Pacific at Mazatlan, and it is stated that as a result of the merger's plans the federal government will shortly order the long projected extensive improvements in the harbor at Mazatlan, which it is expected will cost upwards of $10,000,000.

By a system of dredging and proper breakwater construction the harbor of Mazatlan can be made the finest on the Mexican Pacific coast, and it is thought it will prove superior to Acapulco. Any improvements of the harbor of Mazatlan will have the unqualified support of the Harrimans in order to insure an economic and profitable terminus for their new road down the west coast.

According to J. F. Gray, secretary and treasurer of the El Riso Copper Company, operating in the Tepazala district of Aguascalientes, the mining town of Tepazala is being undermined as a result of the discovery that it is built on a foundation of valuable slag. This slag was thrown out by the Spanish smelters operated at Tepazala a century ago, and it is said that it contains values in copper and silver ranging from $6 to $25 a ton. The slag is being shipped to the Aguascalientes smelter.

Mr. Gray states that the slag craze struck the town of Tepazala some time ago. Miners secured a concession from the state government to dig up the streets, removing the slag and replacing dirt and stone. The government is paid the sum of 25 cents per ton for the slag, and the contractors ship it to the smelter, where they obtain good prices for it.

Recently the slag craze reached its height when the Hotel Ocampo, the only hostelry of the town, was partially torn down and the foundation removed to permit workmen to excavate and take out the refuse mineral. Many tons of ore were taken from under the hotel. Afterward the excavation was filled up with dirt and the hotel is now being put in order again. The proprietor realized enough from the sale of the slag, it is said, to build a much larger hotel than the one he has at present.

SOUTH DAKOTA

Mining men from the Black Hills state that the Homestake is again on its feet in good shape, and in thirty days its mills and mines will be outputting their normal product. The effects of the great fire that did so much damage are almost obliterated, and the 2,500 men and 1,000 stamps are hammering away as before the fire. All the camps in the Hills are active and the general output is quite up to former years.

Extensive preparations are going on among mining men to make a fine mineral display at the state fair to be held in Huron, September 9th, 10th, 11th, 12th and 13th.

The Deadwood and Lead people propose to make the mineral exhibit equal to the one they displayed at the St. Louis World's Fair. Col. W. J. Thornby, in charge of the exhibit, has been industriously stirring up his lieutenants throughout the Black Hills, with the result that the best of the vast mineral yield of this portion of the state will be shown at Huron.

From Custer there is to be a slab of mica, in fact half a ton will be shipped, that should prove most interesting and instructive to those who have never seen this mineral in its native state. Then there is to be a good assortment of tin ore and stream tin from Hill City, wolfram from the Southern Hills, which John Gray has kindly offered to send, amblygonite, a lithia rock, Fuller's earth, various species of high and low grade gold bearing rock from the Homestake, Golden Reward, North Homestake, Reliance and other Hill companies, a splendid offering of lead and silver ores from the old Carbonate camp by Bert Harris, and Charles Upham's own cabinet of gold specimens. Mr. Upham has a collection of some of the richest specimens ever found in the Black Hills, free gold ore from the Holy Terror mine in its palmiest days, which he will take over personally to Huron if assured that proper arrangements will be made to exhibit it without danger of loss or theft. In all, Col. Thornby believes that there will be over twenty different kinds of minerals from the Black Hills on exhibition at the fair.

The Pioneer-Times says: James D. Hardin, president and promoter of the Branch Mint Mining Company, one of the biggest exploits in the Black Hills, arrived on the Burlington from New York, where for the past six months he has been completing the financial arrangements for the commencement of operations in the company's big 500-ton mill at Galena. Hardin has been fighting a strenuous battle with some of the giants of the money world of the great eastern metropolis and that he came off victor and saved the Branch Mint from the stock jobbers, is another laurel to be added to the achievements of Black Hills men. This is shown by the fact that in the face of a determined bull movement to unload and drive down Branch Mint stock, Mr. Hardin retrieved it from 6 to its present figure of 20 cents per share. He has ample backing to carry out his great plans for the development of the project that has required his time and energy for the past few years, and he returns to Deadwood to start the big mill and add it to the list of successful treatment plants in the Hills.

Custer—The American Mica Mining Company, which has under bond and is developing the St. Louis mica mine, seven miles east of Custer, has rented the Reder warehouse building and will put to work a force of boys and girls next week trimming and sorting mica. The company has not as yet determined as to whether they will put in a splitting department or not.

Charles P. Doney of Indianapolis, secretary and treasurer of the Ivanhoe Gold Mining & Milling Company, who has been at the mine for some time, came up to Deadwood Tuesday evening and spent yesterday looking over the mills of Deadwood and the Homestake at Lead. He will return to Custer this morning. The property is located seven miles east of Custer. A force of eight men have been constantly employed in development work and have opened up some fine ore bodies. The company will erect a fifty-ton Chilean mill for crushing.

The company has a working shaft down 220 feet and 1,500 feet of tunnel, disclosing five ledges, ranging from five to forty feet.

Work will soon be resumed on the ground of the Black Hills Porcelain Clay & Marble Company. The property has been leased for fifteen years to a party of Sioux City capitalists, who are amply able to put in all necessary machinery and operate on an extensive scale.

The property consists of two groups of claims, one containing mica located eight miles east of Custer and the other producing lithograph stone, situated about sixteen miles west of the same place. The mica ground was located by Lee Hoyt and Aaron Dunn some years ago and was successfully worked. At one time regular shipments of mica were made and a car of good grade material was sent out every month.

A party of stockholders and officers of the Victoria Mining Company from Omaha and other eastern points came in for an inspection of the property on Squaw creek. One of the prime objects of the present trip is to be present when the 200-ton mill is formally started, which will probably be in a few days. This mill was erected over a year ago, but was never operated. Considerable development work has

been accomplished on the property daring the past year and some excellent ore shoots opened up.

Rochford—G. P. Bilups of Rochford, who was recently in Deadwood, is authority for the statement that steps are about to be taken to insure the resumption of work on the ground of the Ohio-Deadwood Mining Company, whose property is located in the Rochford district. Several years ago this company did considerable work on its property, and at that time I. B. Murphy was one of the principal movers of the enterprise. Word has been received that Mr. Murphy, who is now located at Los Angeles, is about to leave for Ohio, where he will get together the stockholders of the company with a view to arranging the affairs of the outfit and getting it again into working order. The company has 350 acres of ground, located north of the Standby property and across the Burlington track from the town of Rochford. A large number of open cuts have been run on the ground and an amount of good grade ore is exposed.

While conducting the former operations of the Ohio-Deadwood Company I. B. Murphy resided for the most part at Hot Springs, and after leaving the Hills, went to California, where he purchased 3,000 acres of timber. He is said to have made a modest fortune out of his investment and is now in shape to again take up the Ohio-Deadwood proposition and put it through successfully. He and his family now make their home in Los Angeles.

The Devil's Tower folio, just issued by the United States Geological Survey, as Folio 150 of the Geologic Atlas of the United States, describes the geography, geology and mineral resources of what is called by the survey the Devil's Tower quadrangle. This quadrangle includes about 850 square miles, in the northwestern part of Crook county, Wyoming, its northern limit being the Montana-Wyoming state line. Its southeastern two-thirds lies in the northern extension of the Black Hills uplift, and its northwestern portion extends into the great plains, so that its topography exhibits features of both regions. Elevations within the quadrangle range from 3,500 feet above sea level in the plains region to 5,800 feet at the highest point of the Black Hills area. The mineral resources of the quadrangle are described under the headings coal, building stones, clays, gypsum, soils and water supply. Although coal has not been discovered within the area, it may possibly occur here in local basins. For the building stones, clays and gypsums there is at present no demand, as the region is so far from railroads that their development would not be very profitable.

As for the water supply, springs are few and of small volume, and running water is scanty in amount during the greater part of the year, for the waters of the rains and melting snows run off rapidly, usually in freshets. A large amount of this run-off might be saved by dams and made available for irrigation, as suitable dam sites exist at many localities, especially on the higher slopes. Throughout the quadrangle prospects are excellent for obtaining water supplies by means of artesian localities. As the region is semi-arid, the value of these waters to the future settlers can not be overestimated.

That the recent announcement of a strike on the property of the Ama Queen Gold Mining Company's property, in the Custer Peak district, underestimated the extent of the find is fully evidenced by the following letter received here yesterday from a reliable source:

"The strike made last month on the property of the Ama Queen Gold Mining Company's property, near Albany, by the Sherman brothers, has shown wonderful assay values in the tests that have since been made. From seventeen assays, including averages and samples of rock that would not yield free gold in the pan, concentrates and everything, good, bad and indifferent, an average of $540.91 per ton was found in gold. One assay, made from a blue quartz carrying some pyrites, gave a return of $408.19 per ton.

"This strike is not really to be classed as a new discovery, because this vein has been known to exist since 1896. The former developments came to a sudden end when the vein was cut off by a fault, caused by a dyke some quarter of a mile distant, on the slope of the hill. It is evident by the development just made that this dyke has caused a normal fault of about thirty-eight feet.

Having posted the entire surface mass that far in an easterly direction, the former owners became discouraged with having cut the vein, and disposed of their interest to Mr. J. C. Sherman, who took up the work to ascertain the whereabouts of the rich ore that was found on the surface, which showed assay values of from $50 to $150 per ton and which showed a vein about four feet wide. The confidence of Mr. Sherman and his associates was never shaken in the merits of the property, although it was a hard struggle for men of limited capital to handle.

"The fault that had cut off the vein had broken out of the hill at an angle of about 3 to 1, the material on top being soft while the lower steps were soft, and a natural reservoir for all the water that fell on several square miles of country was formed into a sump at this place, the line of the fault being just at water level, about thirty-six feet from the collar of the shaft.

A stem pump to handle the fifty gallons of water per minute was inserted and kept busy to handle the water. At seventy-two feet a drift was run to the west, cutting the vein at about twenty-five feet from the shaft. The vein here was six feet wide.

"The property or the stock of the corporation is owned exclusively by Mr. Sherman and his wife and two sons, Frank A. Sherman and J. Charles Sherman. Persistence would now seem to be reaping its own reward, and it looks as though the Shermans were coming to their own.

The shaft of the Holy Terror has been retimbered to the 200-foot level and pumping began again this week. The water has risen to between the second and third level, but it will take but a few days to lower it to the 400 again, as the back country has not had time to fill up as before. Manager McNulty thinks the greatest difficulties have been passed in the work of unwatering and from now on things will go more smoothly.

WYOMING

From Douglas, Wyoming, come reports that the Esterbrook mine, one of the most promising properties of the Laramie Peak district, has been purchased by the eastern stockholders, and a new company will be organized to operate the mine. The old company's affairs had become involved and the sale was made in order that they might be straightened out. Development of the property will proceed.

Manager Bancroft of the Oregon Short Line Railroad makes a statement of the measures undertaken by the transportation lines in an endeavor to fulfill their obligations to the public.

He recites the enormously expensive undertakings of the Oregon Short Line in securing 25,000 tons of coal in Australia, a portion of which has already arrived, and the extensive purchases by the Short Line & Union Pacific of coal in Colorado, Illinois and the southeast, which will greatly relieve the strain. He declares positively that the railroads are doing everything possible to foster and encourage the development of new coal properties. Two new mines recently opened at Kemmerer will shortly produce

1,000 to 1,500 tons of coal daily. The old Almy mines, recently re-opened and equipped with new machinery by the owners and with trackage by the Union Pacific are now producing ten to twelve tons a day and expect by October 1st to increase to twenty-five or thirty tons a day.

Coalville and Grass Creek properties had been enabled to double their capacity within the past sixty days. The latter mines, being in Utah on the Union Pacific, have through rates to Oregon Short Line stations and the coal therefrom will help relieve the situation in Utah. The mines owned by the Union Pacific Coal Company at Pleasant Valley, Utah, on the D. & R. G., have been reopened and are loading from 300 to 400 tons a day. They hope to increase this output by Oct. 1st, to 700 or 800 tons daily. That coal goes to the Southern Pacific and to the extent that it supplies that demand it releases Wyoming coal for commercial use. The Wyoming Coal & Coke Company at Rock Springs would shortly produce 300 tons of coal a day, which would go to the Amalgamated Copper Company, owner of the mines, thus decreasing the demand of sugar factories on commercial coal. Mr. Bancroft cannot agree, in view of this development, that the railroads are interfering with the output of coal.

The Daily Leader declares that few people, even in Wyoming, have any idea of the present conditions in that section of central northern Laramie county, known as the Guernsey district, and comprising the iron mines of Sunrise and Chicago, the Platte Valley irrigation district and the railroad work of three large concerns.

Fewer people still can realize the possibilities in store for this section of the state, where fabulous iron deposits, mammoth irrigation schemes and a network of railroads will work wonders.

The wonderful magnitude of the iron deposits in the mountains for ten miles and more north of Guernsey, with a similar area east and west, can be illustrated best by showing that Senator Guernsey has opened a ledge within sight of the town named after him, 66 feet thick, and that the Colorado Fuel and Iron Company, at Sunrise, eight miles away, has dug quite a dell into a mountain of iron from which it has shipped to its smelters at Pueblo, Colorado, where the ore is transformed into steel rails, on an average of fifty carloads a day for these many years, thereby making an impression somewhat in size of the removal of a sand kernel from an ant hill.

The hills for miles around Sunrise are solid ore, averaging 60 per cent iron. The side of one mountain has been cut away and now there is a pit 250 feet deep, where several years ago the mountain stood, and in this pit several hundred men are working night and day blasting off the ore, which is hoisted in great buckets to the top of a tipple, and then is dumped into cars for shipment, and at this writing about eighty cars are shipped to the smelter every day. About fifty feet under this pit is a railroad track and the ore from the pit goes down to the track through shaft prepared for that purpose.

Holes are drilled into the ore and loaded with dynamite, and when the fuse is lighted an engine gives the alarm and everybody hikes out for shelter, for by the explosion the pieces of ore are thrown into the air for hundreds of feet and when it comes down it strikes very hard, especially if it happens to strike on a person's head. Neighboring roofs have all been perforated by pieces of ore coming down and going through.

When these shots are fired off they are equal to the booming of the guns of a great fort at war time, and the shots are fired at intervals night and day, but only the visitors are disturbed in the night time by these shots. The people living in Sunrise have become used to it and never hear the sound unless they happen to be awake. About midnight after our arrival the first shots were fired and it sounded like the entire mountain had been swallowed up by the mighty concussion; indeed few were the visitors who slept after that night.

To visitors these mines are very interesting, and anyone who can spare a couple of days away from home could go no place that would afford them more interest than the sights and experiences of the Sunrise iron mines. From 500 to 700 men are continually employed at the mines.

Heavy sage brush, with here and there a shrubby tree, form the surrounding surface growth, the country being high, rolling and in most part very dry. But for a gulch spring here and there, which furnishes water to settlers some distance away from the mine, there is no natural water in this vicinity, and this utility is supplied to mine and miners by a tank car hauled several times a day from a large stationary tank near Guernsey. This tank car is filled from the big tank, which in turn is filled by a pumping system getting its supply from the inexhaustible Platte river.

Sunrise is a company town in the fullest sense. Everything, and may it be said (?) everybody, is owned by the Colorado Fuel and Iron Company. No special brand is necessary, for the fact impresses itself indelibly on all who come here. Visitors are not especially welcomed, which a glance at the passenger accommodations on the train that meets the Colorado & Southern at Hartville Junction forces itself on all comers.

From Hartville Junction the spur to Sunrise via Guernsey, a distance of about fifteen miles, belongs and is operated by the Colorado Fuel and Iron Company. It is a fine piece of railroad engineering, with its high grades and frequent curves, and one would not mind paying two prices for transportation, as he must, if only the accommodations were adequate, but, as has been said, the company seems not to care for that sort of traffic. Having constructed the line for its own convenience, no doubt it considers itself an accommodator of the public by attaching a caboose to its trains of ore cars, which caboose has poor seating capacity for about eight people, though several times that number travel over the route as a rule.

Train connections are made at Hartville Junction with both the north and south train of the Colorado & Southern. On leaving the Junction the grade rises abruptly several hundred feet and then runs about the hills in a westerly direction until the Platte river is reached. It crosses that stream on a substantial bridge. The train then backs onto the track of the Burlington & Missouri river railroad to the depot of that company at Guernsey. After some switching the train starts out for the north up hill six miles to Hartville and then on up two miles to Sunrise.

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THE STOCK AND METAL MARKETS

Colorado Springs

Sept. 11.—The week opened on the exchange today with Fanny Rawlins advancing 7. Isabella was strong at 21¾. Work sold at 17¼. A bid was turned in for Portland at $1.08. Tuesday El Paso gained to 22. Wednesday Portland sold at $1.10, several cents higher than for some time. Following are the quotations:

Mines.

Stock.	Bid.
Acacia	07½
Black Belle	01
C. C. Con.	04¼
C. K. & N.	05
Dante	04¾
Doctor-Jack Pot	05⅞
Elkton	51½
El Paso	37
Fanny Rawlings	06¼
Findley	35
Gold Dollar	06
Gold Sovereign	03⅝
Index	01¼
Isabella	21¼
Jack Pot	04½
Last Dollar	02
Lexington	02½
Mary Cashen	01
Mary McKinney	40
Mollie Gibson	01½
Moon Anchor	02¼
Old Gold	03½
Pharmacist	03⅛
Portland	.105
Vindicator	78
Work	17¼

Unlisted.

Stock	Bid.
Golden Cycle	42
Jennie Sample	04
Jerry Johnson	05½
United Gold Mines	05⅜

Prospects.

Stock.	Bid.
American Con.	0075
Banner	01½
Bob Lee	009
Buckhorn	0065
C. C. & M.	0095
Des Moines	009
Gould	02
Ida May	02½
Jolly Jane	008
Keystone	01
Little Nell	0075
Little Puck	01⅜
Mary Nevin	01½
Mt. Beauty	06¼
New Haven	01
Raven	01
Republic	008
Requa Savage	03¼
Rose Maud	01⅝
Rose Nicol	01
St. Thomas	01⅜

Miscellaneous.

Stock.	Bid.
Anchor	003
Black Wonder	002
Blanche	003
Cable	005
Colo. Gold Camp	003
Easter Bell	002
Favorite	0015
Flower of the West	007
Gold Hill	002
Grace	002
G. Gold Belt	002
Hummer	003
Key West	0015
Kitty	002
Lucrative	0035
Metoa	005
Missouri	004
Montreal	005
National	0085
Nellie V.	003
O. K.	002
Red Spruce	002
Tenderfoot	003
Texas Girl	003
Uncle Sam	003
Wide Awake	001
Volcano	002

Denver

Sept. 11.—The following were the quotations and sales on the Denver Mining Stock Exchange yesterday:

Stock.	Bid.
Black Belle	03
Dante	04⅛
Doctor-Jack Pot	05⅞
Gold Dollar	06
Gold Sovereign	03½
Lexington	02⅝
Isabella	21
Work	17¼
Jerry Johnson	05¼
Old Gold	03⅜
Moon Anchor	02⅛
Mary Nevin	02
Bob Lee	8.50
National	8.50

New York

Sept. 12.—The large selling interests are quite confident that with the cut in the price of electrolytic copper at 18 cents and a probable corresponding reduction in the price of Lake, the minimum limit has been reached for the present at least.

Asked about the present situation, the representative of one of the largest selling agencies said: "Following the cut in price to 18 cents, consumers are buying sparingly and will doubtless continue to do so. We hope, however, that the limit has been reached and can see nothing at the present time which indicates otherwise. Consumers, the wire and manufacturing interests, have been holding off from making purchases, and we know of several million pounds which will in all probability be taken by them. If the buying comes in sufficient volume, of course the tendency will be rather for the price to advance from the present level. However, unless conditions should develop differently than we anticipate there will be no further reduction."

Phelps, Dodge & Co. have made sales of copper for September delivery at 18 cents a pound, and they are quoting 18 cents for October delivery. It is reliably reported that the United Metal Selling Company is also making sales at this price for September delivery. It is believed that the deadlock is broken.

A Phelps, Dodge interest says: "We have made considerable sales of copper for September delivery. The big wire manufacturers and others are coming into the market, and all the consumers seem ready to recognize this price. We are openly quoting 18 cents for October delivery, and there seems to be no question that this is the price that will rule."

The only statement regarding copper prices made by the United Metals Selling Company is that electrolytic copper is selling at 18 cents. It is expected that all other companies will follow the example of Phelps, Dodge & Company and the United Metals Company.

Following are the quotations:

Stock Bid.	Bid.
Amalgamated Copper	61⅜
American Smelter	91½
American Smelter, pfd.	97¾
Colo. Fuel & Iron	23⅛
Anaconda Copper	38½

Curb Quotations.

*Stock.	Bid.
Arizona Commercial	13½
American Saginaw	....
Ahmeek	70
Black Mountain	4
Cumberland Ely	6⅜
Davis-Daly	7¾
Denn Arizona	....
Eagle	2¾
East Butte	6
Giroux	5¼
Greene Cananea Copper	9¼
Globe Cons. Copper	6½
Hancock	6
Keweenaw	5
Mines Co. of A.	1⅜

Nevada Utah	3¾
Nevada Cons.	9¾
Nipissing	7
Superior & Pittsburg	9½
Shattuck	....
Utah Apex	3½
Warren	....
Wolverine Arizona	2
B. & L.	1⅛
Majestic	2⅛

*Otis & Hough.

Boston

Boston, Sept. 12.—One of the largest Lake Superior copper interests says: "One would think from the rather gloomy views of the copper selling interests as published, that the brass mills of the country and the other large consumers of the metal were going out of business. I notice that 'the smoke is going up the chimney just the same,' and I venture the opinion that Mr. Brooker's mills are not working up copper except on actual orders for the finished goods.

"Now I happen to know Mr. Brooker, and I hope I am giving away no confirence when I say that he is a good poker player. He has to have some copper pretty soon, and it would not be good business for him to emphasize too strongly his copper necessities, and it might be to his advantage to give the impression that all the demand had suddenly and mysteriously vanished to parts unknown.

"Now, of course, it would be folly to attempt to refute the statement that there has been some actual curtailment in the demand for the red metal; I admit this. But copper is being consumed in considerable quantities every day, and while the large customers may not feel free to buy more than a month's supply at a time, they have to purchase some, and this 'some' when representing the aggregate of the company's necessities even under present business conditions, is a large amount of copper.

"It was not the high price of copper that so suddenly cut off the demand, but it was purely a question of money, or rather of restricted credits. Had it been found possible to sell new securities I have no doubt that we would today be selling copper in large quantities at between 25 and 30 cents per pound. The money rate, however provided a brake which has slowed up the country's industries, and I am not so sure but that it is a pretty good thing that we find ourselves a little short of money now and then. What a towering and tottering structure this country would have reared if it had continued to pile up its credits.

"A corrective has been applied, and it will work for the ultimate good of the security holder."

The gross production of the Nipissing company for August amounted to about $125,000.

The greatest production is now coming from the Kendall vein, named after L. B. Kendall, a director and partner of Eugene Meyer, Jr. About $75,000 of the above production came from this new vein.

On August 10 one carload of Kendall picked ore was shipped to the smelters weighing 30½ tons, which assayed 4,430 ounces of silver per ton, the shipment having a gross value of $88,000.

The Kendall shaft is down 58 feet and the vein at the bottom has pinched down to an inch of calcite, but the shaft is again in the conglomerate and the management does not expect the pinching of the vein to be permanent, or to indicate that they are close to the end of the ore body, but simply look upon it as a tight place which may occur at any portion of the vein.

The old Bonanza vein No. 49 is now producing very little, not over $1,500 per week.

Imports of copper and manufactures of copper in July, 1907, totaled $3,509,698, compared with $2,586,198 in July, 1906; for seven months ended July, 1907, the imports were $26,696,053, against $16,822,635 in the seven months ended July, 1906.

Exports of copper and manufactures of copper for July, 1907, totaled $7,469,828, against $7,853,337 for July, 1906; for the seven months ended July, 1907, the exports amounted to $54,919,204, against $49,553,614 in the same period in 1906.

Following are the quotations:

*Stock.	Bid.
Adventure	2¼
Arcadian	4¼
Allouez	30
Boston Con.	17⅝
Balaklala	5¾
Butte Coalition	15¾
Calumet & Hecla	600
Calumet & Arizona	108
Centennial	19
Copper Range	57½
Daly-West	13
Franklin	8
Granby	....
Isle Royale	13½
La Salle	9
Massachusetts	3¾
Michigan	8¾
Mohawk	60
North Butte	47
Old Dominion	23½
Osceola	....
Parrot	13
Quincy	81
Shannon	10¼
Tamarack	63
Trinity	14¾
United Copper	50
U. S. Smelting	37
do. pfd.	38
Utah Con.	36
Victoria	4¾
Winona	6½
Wyandot	95
Wolverine	112

*Ottis & Hough.

Nevada

San Francisco, Cal.—Closing quotations on the Mining Exchange Sept. 12th:

(Received over private wire of O. L. Malo & Co., 221-22 Boston Block, Denver.)

Tonopah.

Stock.	Bid.
Tonopah-Nevada	$11.00
Montana Tonopah	2.90
Tonopah Extension	1.27
MacNamara	22
Midway	76
Tonopah Belmont	2.75
Tonopah North Star	19
Ohio Tonopah	2
West End Cons.	66
Rescue	13
Golden Anchor	12
Jim Butler	83
Cash Boy	5
Home	4
Boston Tonopah	4
Monarch Pittsburg Ext.	6
Montana Milday Est.	3
Golden Crown	6

Goldfield.

Stock.	Bid.
Sandstorm	45
Red Top	3.50
Mohawk	15.50
Columbia Mountain	48
Jumbo	....
Jumbo Ext.	1.67
Vernal	13
Pennsylvania	....
Kendall	23
Booth	45
Blue Bull	33
Adams	13
Silver Pick	56
May Queen	10
Nevada Boy	7
Black Butte Ext.	6
Blue Bell	17
Dixie	6
Goldfield Columbia	25
Hibernia	7
St. Ives	83
Lone Star	21
Potlatch	....
Oro	19
Mayne	6
Atlanta	48
Great Bend	63

Simmerone	....
Empire	12
Red Top Ext.	25
Florence	4.25
Diamond B. B. Cons.	24
Goldfield Daisy	1.40
Laguna	....
Commonwealth	....
Combination Fraction	2.05
Great Bend Ext.	12
Great Bend Annex	8
Milltown	....
Black Butte Bonanza	6
Kewanos	68
Esmeralda	10
Portland	21
Crackerjack	19
Frances Mohawk	1.00
Red Hills	53
Mohawk Ext.	11
Lou Dillon	12
Yellow Tiger	21
Grandma	17
Silver Pick Ext.	7
Yellow Rose	6
Goldfield Cons.	7.00

Bullfrog.

Stock.	Bid.
Original	5
Bullfrog Mining	11
National Bank	....
Amethyst	21
Gold Bar	55
Denver Bullfrog Annex	....
Bonnie Clare	40
Mayflower Cons.	31
Montgomery-Shoshone Ext.	6
Montgomery Mtn.	11
Nugget	4
Tramp Cons.	34
Victor	....
North Star	....

Manhattan.

Stock.	Bid.
Manhattan Cons.	35
Manhattan Mining Co.	6
Gold Wedge	.6
Seyler Humphrey	5
Dexter	10
Crescent	3
Combination	2
Granny	23
Original Manhattan	9
Broncho	8
Jumping Jack	14
Stray Dog	10
Indian Camp	7

Other Districts.

Stock.	Bid.
Fairview Silver King	....
Fairview Eagle	1.40
Nevada Hills.	5.25
Pittsburg Silver Peak	1.37
North Star Wonder	....
Eagles' Nest.	32
Ruby Wonder	....
Alice of Wonder	....
Fort Red Rosa	....

Metals

New York, Sept. 11.—The London tin market was lower with spot quoted at £166. Locally prices ranged from $36.50 to $37.00 with the market easy.

A further decline was reported in the London copper market with spot closing at £68 10s and futures at £69. Locally the market was weak and lower with lake quoted at $16.30@$17.00; electrolytic at $16.00@16.30, and casting at $15.75@$16.00.

Lead was higher in London at £19 17s 5d. Locally the market was weak but unchanged.

Spelter was unchanged at £20 15s in London and the local market was weak at recent prices.

Iron was unchanged in London with standard foundry quoted at 53s 9d and Cleveland warrants at 54s 9d. Locally no change was reported.

St. Louis, Sept. 11.—Lead, dull, $4.65. Spelter, weak, $5.15.

THE COPPER SITUATION.

Boston, Sept. 12.—An interest actively identified with one of the largest selling companies in the copper industry says: "Reports to the contrary notwithstanding, I am reluctantly compelled to state that copper is not yet moving in large quantity.

"Of course it does not require any great intelligence to predict that the time is gradually approaching when Mr. Brooker and the many buyers who are guided by his action, must be forced into the market.

"At the moment Mr. Brooker assures us that it is not a question of price; he is not disposed to buy immediately now for future delivery at any figure. He says that when the demand for finished goods looks a little better, he will then be in a position to gauge his requirements of raw copper.

"When the long-deferred buying does come into the market, and this may develop at any moment, and assume proportions seemingly larger than they really are, it will only be for such supplies as will take care of the immediate future. No large buying of 'futures' need be expected. The buyers will probably contract for a sufficient amount of the metal to keep their plants running say for the next four or six weeks.

"The copper consumer or manufacturer now has the whip-hand. He knows that the producer is facing the problem of financing a steadily growing accumulation of copper at a time of severe money stringency, while the banks are not over anxious to loan on copper collateral except, of course at pretty fancy rates.

"All of the large producing companies, without exception, have a large amount of unsold copper on hand, amounting on the average to not less than two months' production, or say 150,000,000 pounds in the aggregate. According to its contracts with the producers, the United Metals Selling Company is obliged to advance at least 70 per cent. of the value of this copper, on which advances mining companies pay 5 per cent.

"Of course, with its strong international credit the Metals selling company is not yet placed in an embarrassing position, but, nevertheless, it is not altogether a pastime to arrange for the financing of the steadily-growing accumulation in times like the present.

"So long as all the producing companies are in practically the same predicament, I am of the opinion that the wisest course for them to pursue would be to shut down for a month or two, until such a time as our accumulated supplies had satisfied the demand. What is the use of piling up unsold stocks and borrowing money on that growing pile at any such interest rates as now prevail? This may sound a little drastic, but the more it is considered the more reasonable, I think, it will appear. Unless the copper industry will so regulate the supply as to prevent demoralizing overproduction, we are likely to have the price go as much too low as it went too high.

'I do not recall during the many years of my experience in the copper business a situation which paralleled the present. Seven years ago when some of the producing and selling interests were endeavoring to maintain a fictitious market at 17 cents per pound, it was a question of price. The consumers needed the copper, and we tried to make them pay 17 cents. Had we held to our course sixty days longer we would have won out, but we became frightened and down went the price with a thud.

"Today it is not a question of price ith the consuming trade. They are not in urgent need of copper, and say they will only buy in sufficient amount to cover orders for manufactured goods. These orders are slow in coming in, and I do not expect radical change in the situation until we see a better prospect of easier money.

"Now all this may sound strange coming from one whose business depends upon good copper prices and a good demand. But what is the use of fooling ourselves? For the moment we are 'up against it,' and in time we shall work out of it. Practically no copper has been sold the past three months. The Quincy people say they have not sold since last March.

"I fear we were deceived as to the extent to which copper had been sold up to the first of July. Now that an account of stock is being taken, we are forced to the sad discovery that the amount of unsold copper is greater than we believed could be possible."

PERSONALS

Consulting Engineer Fred W. Bradley, and president of the Tacoma smelter, is at Juneau, inspecting the Treadwell properties.

Henry Wells has accepted the superintendency of the Ontario copper mine owned by Mackin & Dillon, near Torreon, Mexico.

J. W. Bennie, manager of the Shannon Copper Company, Clifton, Arizona, is inspecting copper properties in various parts of Arizona in the interest of his company.

W. J. Larson is in charge of the San Luis mine, Zacatecas, of the San Luis Mateo Mining Company, of which Campbell Dickson, of Cleburne, Texas, is president.

J. J. Wilson of Broken Bow, Nebraska, who is largely interested in the Taviche district, Oaxaco, Mexico, is now at the properties and will remain there permanently.

Ralph J. Ramer has been appointed consular agent at Zacatecas, to succeed Mr. Von Gehren, who has gone abroad. Mr. Ramer has extensive mining interests in Mexico.

Dudley H. Norris, president of the Negociacion Minera de Magistral S. A. of Zacatecas, Mexico, is in Denver, arranging for the equipment of a 250-ton smelter, to be erected at Zacatecas.

A. K. Stewart, general manager of the St. Louis & Oaxaca Iron & Steel Co., who also has charge of the properties of the Mexico Gold & Silver Mining Co., at Santiago, Minas, is at present making a tour of the district.

C. L. Daniel, formerly connected with the Texas-Mexican railway, with headquarters at Laredo, Mexico, has gone to Valerdena, where he will take charge of the auditing department of the Valerdena Mining & Smelting Company.

T. Elliott Smith, owing to ill health, has resigned as manager of the Santo Domingo Mines of the Santo Domingo Mining Company, in the Hostotipaquillo district, state of Guadalajara, Mexico. He has been succeeded by Patrick Fitzgerald, formerly of Colorado.

A. P. Lowe, deputy minister of mines of Canada, is on an extended trip through the Canadian west to look over the work of the geological survey and to inspect the various mining districts of the west with a view to ascertaining their needs from a deparmental point of view.

Charles T. Hutchison, for many years associated with the Union Iron Works, San Francisco, and of late years manager of the mining machinery department, recently severed his connection with that concern to accept a similar position with the Joshua Hendy Iron Works of San Francisco.

P. A. Tappan, a prominent business man of Milwaukee, Wisconsin, was in the city a few days ago on his return from Ouray, where he is interested in valuable mining properties. He thinks Ouray the brightest jewel in the diadem of the Rockies.

It is reported that Chris Hart of Idano Springs, has become a successful and prosperous miner up there.

He is an old-time San Juan miner and business man of Telluride, Lake City and other San Juan districts and his friends will be glad to hear of his success.

Dick Clark, the original "Deadwood Dick," is back to his old stamping ground in Deadwood, Dakota. We knew Dick Clark when he was a soldier of Company H, First Colorado cavalry—if he is the same Dick. A Lead paper says he has been prospecting in the Copper mountain country of Wyoming for the past year, where he claims to have some valuable property.

Frank E. Wire of Illinois, president of the Square Deal Mining Company, whose properties are at Frisco, Summit county, was in the city a few days ago accompanied by a number of the eastern stockholders, who went up to Frisco to investigate their holdings. The party as it left Denver was composed of President Wire, in charge; George D. Pearce, Walworth, Wisconsin; Howard A. Peterson, Ames, Iowa; Ernest L. Heistand, Marshalltown, Iowa; Mr. and Mrs. H. R. Adams, Denver; H. F. Scoville, Rockford, Illinois; C. L. Colburn, M. E., Denver.

Ulysses S. Grant, for five years professor of geology at Northwestern University, Evanston, Illinois, has been appointed dean of the College of Liberal Arts. He succeeds Thomas Holgate, who has been dean for ten years. Mr. Holgate has been granted a leave of absence for one year. He will go to Europe for a much needed rest. Mr. Holgate was acting president of the university before A. W. Harris accepted the office.

OBITUARY

James Halloran, a pioneer mining man of the Cripple Creek district, and locator of the Chicken Hawk mine on Guyot hill, dropped dead on Fourth street at Victor the 22nd ult. He was suddenly stricken with apoplexy and died where he fell. Deceased was sixty-seven years of age, unmarried, was a member of the B. P. O. E., No. 367, of Leadville, and had lived in Colorado for the past thirty years. He was born in Ireland in 1850 and was in Leadville in the early eighties.

FOG-DISPERSING APPARATUS.

The fog-dispersing station proposed by M. M. Dibos includes. A large Ruhmkorff coil, giving a spark of about one meter, with a primary current from accumulators or a dynamo. In the primary circuit are a rotating interrupter and a condenser, in parallel. The current induced from alternating into intermittent by two series of four Cooper-Hewitt mercury-vapor rectifiers then passes to the inner coatings of two large Leyden jars, with connected outer coatings. From one jar a wire leads to the earth. A wire from the other—the positive electrode—runs to the top of an antenna mast and there a crown of points scatters the electric waves into the air. With such an apparatus clear spaces 300 to 400 feet across have been formed in dense fog. Such spaces would be useful in harbors and on railroads, but every vessel at sea needs clearness for at least a quarter of a mile in every direction.

Temperature and humidity can be recorded accurately, but the figures give only a vague idea of how we feel climate. W. F. Tayler of Shanghai has a way of comparing climates by the varying degrees of comfort or discomfort produced. Indicating mugginess by the term 'hypher," he divides his hypher scale from 1 to 10, and lets 10 represent the worst possible day—the hottest, dampest and most enervating day of China, while 0 applies to the ideal summer day—warm, bright and bracing. Experiments show that normal persons estimate the varying degrees very accurately.

BELGIAN FUEL TRADE .

Coal imports are somewhat less than last year, and so far are the exports. Imports of coal for the six months ending with June were 2,589,150 tons as against 2,602,260 tons for the corresponding period last year; while of coke there was received 184,971 tons, against 183,307 tons, and of briquets 77,458 tons, against 64,486 tons. Of the coal received this year, Germany supplied 1,342,980 tons, against 1,467,620 tons in 1906, and Great Britain 889,509 tons, against 689,246 tons; while the remainder came principally from France. Germany sent most of the coke and briquets this year

Exports of coal for the half year were 2,246,529 tons, which compares with 2,453,441 tons for the same time in 1906; of coke, 418,823 tons, against 428,380 tons, and briquets, 214,006 tons, against 212,020 tons in 1906. Of the coal sent abroad this year France received 1,704,565 tons, as compared with 1,889,268 tons in 1906.

Capitalization and Dividends of North American Mines and Works

Gold, Silver, Copper, Lead, Nickel, Quicksilver and Zinc Companies.

NAME AND LOCATION OF COMPANY.	Authorized Capital Stock.	Shares Issued.	Shares Par Val.	Dividends Paid in 1907	Dividends Total to Date.	Latest Date.	Latest Amt.
Acacia, g., Colo	$ 1,500,000	1,433,000	$ 1	.....	$ 73,780	Dec. 1904	$0.01
Adams, s, l, c, Colo	1,500,000	150,000	10	.....	746,000	Jan. 1905	.05
Aetna, Con., q, Cal	500,000	100,000	5	.....	325,000	April. . . . 1900	.15
Alaska Goldfields, Alaska	1,500,000	250,000	5	.....	260,000	Jan. 1901	.15
Alaska Mexican, g, Alaska	1,000,000	180,000	5	90,000	1,595,381	Jan. 28 . 1907	.50
Alaska Treadwell, g, Alaska	5,000,000	200,000	25	200,000	8,585,000	Jan. 28 . 1907	1.00
Alaska United, g, Alaska	1,000,000	180,200	5	54,060	280,200	Jan. 28. . 1907	.30
Alice, Mont.	1,000,000	400,000	25	.....	1,115,000	Jan. 1899	.05
Amalgamated, c, Mont.	155,000,000	1,530,879	100	6,123,518	49,540,746	May 27. . 1907	2.00
Am. Sm. & Ref., com, U. S	50,000,000	500,000	100	1,750,000	10,500,000	April 15 . 1907	1.75
Am. Sm. & Ref., pf, U. S	50,000,000	500,000	100	1,750,000	24,331,553	April 1. . 1907	1.75
Am. Sm. Securities, A pf, U. S	17,000,000	170,000	100	510,000	2,295,000	June 1 . 1907	1.50
Am. Sm. Securities, B pf, U. S	30,000,000	300,000	100	750,000	3,000,000	June 1 . 1907	1.25
Am. Zinc, L. & Sm., Mo	3,750,000	150,000	25	.....	180,000	Jan. 1904	1.00
Anaconda, c, Mont.	30,000,000	1,200,000	25	4,200,000	35,100,000	Apr. 18. . 1907	1.75
Annie Laurie, g, Utah	5,000,000	25,000	100	.....	439,561	Apr. 1905	.50
Atlantic, c, Mich	2,500,000	100,000	25	.....	990,000	Feb. 1905	.50
Bald Butte, g, s, Mont	250,000	200,000	1	.....	1,337,148	Jan. 1904	.12½
Baltic, c, Mich.	2,500,000	100,000	25	.....	2,650,000	Dec. 17. . 1906	8.00
Beck Tunnel Con., Utah	1,000,000	1,000,000	1	200,000	800,000	May 20 . 1907	.04
Boston, q, Cal	1,000,000	100,000	10	.....	20,000	Apr. . . . 1903	.06
Boston & Colo. Sm., Colo	750,000	15,000	10	.....	402,350	Oct. . . . 1902	.75
Boston Gold Copper, Sm., Colo	1,000,000	1,000,000	1	.....	150,000	Nov. . . . 1901	.02½
Boston & Mont. Con., c, s, g, Mont	3,750,000	150,000	25	3,600,000	54,325,000	May. . . . 1907	12.00
Breece, l, s, Colo	5,000,000	200,000	25	.....	200,000	June. . . . 1903	.05
Brunswick Con., g, Cal	500,000	135,770	1	.....	13,577	Dec. 20. . 1906	.03
Buffalo Hump, g, Idaho	1,000,000	100,000	10	.....	300,000	Jan. . . . 1901	.10
Bullion-Beck & Champion, Utah	1,000,000	100,000	10	20,000	2,770,000	Apr. 15. . 1907	.10
Bunker Hill & Sullivan, Idaho	3,000,000	300,000	10	900,000	8,766,000	May 4 . . 1907	.60
Butte & Boston, c, Mont	2,500,000	200,000	25	.....	1,800,000	Feb. . . . 1904	1.00
Butte Coalition, c, Mont	15,000,000	1,000,000	15	1,000,000	1,800,000	June 26 . 1907	.50
Butterfly Terrible, g, Colo	1,500,000	1,250,000	1	.....	31,250	Oct. . . . 1901	.00½
Calumet & Arizona, c, Ariz	2,500,000	200,000	10	2,000,000	8,000,000	June 1 . 1907	5.00
Calumet & Hecla, c, Mich	2,500,000	100,000	25	2,000,000	101,350,000	Mar. 22. . 1907	20.00
Camp Bird, g, Colo	5,000,000	820,000	5	393,600	3,427,704	Apr. 27. . 1907	.24
Cariboo McKinney, g, B. C	1,250,000	1,250,000	1½	.....	546,837	Feb. . . . 1904	.04
Carisa, g, s, c, Utah	500,000	500,000	1	.....	140,000	Dec. . . . 1906	.01
Cashier, g, Colo	1,000,000	900,000	1	.....	26,160	Apr. . . . 1904	.00½
Centennial Eureka, g, s, l, c, Utah	5,000,000	100,000	25	.....	2,917,700	Feb. . . . 1905	1.00
Center Creek, l, z, Mo	1,000,000	10,006	10	.....	200,000	June. . . . 1905	.10
Central Eureka, g, Cal	4,000,000	400,000	10	.....	799,159	Mar. . . . 1906	.05
Century, g, s, l, Utah	150,000	150,000	1	3,000	33,000	Feb. 15. . 1907	.02
Champion, c, Mich.	2,500,000	100,000	25	200,000	1,800,000	June . . . 1907	1.00
C. K. & N., g, Colo	1,500,000	1,431,900	1	.....	229,104	Dec. . . . 1904	.01
Clinton, g, s, Colo	100,000	1,000	100	.....	60,000	Dec. . . . 1903	.30
Columbus Con., g, s, Utah	1,500,000	283,333	5	99,167	99,167	Apr. 5. . . 1907	.20
Colwyn, Idaho	500,000	400,000	1	.....	4,000	Aug. . . . 1906	.01
Combination, g, Nev.	400,000	360,000	1	.....	873,000	Dec. . . . 1906	.15
Con. Cal. & Va., s, g, Nev	540,000	216,000	2½	.....	3,963,600	July. . . . 1901	.10
Con. Mercur, g, Utah	5,000,000	1,000,000	5	.....	1,180,000	Dec. 19. . 1906	.02½
Con. M. & S. of Canada, g, s, c, B. C	5,500,000	48,338	100	221,688	594,100	May. . . . 1907	2.50
Consolidated, g, Colo.	2,500,000	1,900,000	1	.....	380,000	Mar. . . . 1902	.01
Continental, z, Mo.	550,000	22,000	25	22,000	209,000	Apr. 1. . 1907	.50
Copper Range Con., Mich.	38,500,000	383,781	100	767,562	4,989,153	Apr. 1. . . 1907	2.00
Creede & Cripple Creek, g, Colo.	800,000	800,000	1	.....	16,000	May. . . . 1901	.02
Creede United, g, Colo	500,000	500,000	1	.....	187,500	July. . . . 1906	.00½
Cripple Creek, g, pf, Colo	125,000	125,000	1	.....	45,000	Jan. . . . 1902	.04
Cripple Creek Con., g, Colo	2,000,000	2,000,000	1	.....	180,000	Mar. . . . 1905	.00½
Croesus, g, Calif.	1,000,000	200,000	5	.....	227,300	Aug. . . . 1901	.05
Crowned King, g, s, Ariz.	6,000,000	600,000	10	.....	242,760	May. . . . 1901	.02
Dalton & Lark, g, s, l, Utah	2,500,000	2,500,000	1	.....	350,000	July. . . . 1901	.10½
Daly-Judge, Utah	300,000	300,000	1	225,000	225,000	Apr. 12. . 1907	.37½
Daly, g, s, l, Utah	3,000,000	150,000	20	.....	2,925,000	Mar. . . . 1897	.25
Daly-West, g, s, l, Utah	3,600,000	180,000	20	108,000	5,507,000	Mar. 15. . 1907	.60
De Lamar, g, s, Idaho	400,000	67,180	5	.....	2,926,370	May. . . . 1905	.72
Deadwood-Standard, pf, So. Dak.	600,000	600,000	1	.....	6,000	Dec. . . . 1903	.01
Dewey Con., g, Utah	310,000	10,000	1	.....	5,850	June. . . . 1901	.10
Diamondfield, g, Nev.	1,000,000	732,000	1	.....	14,650	Sept. . . . 1905	.02
Dollon, g, Colo.	1,250,000	1,250,000	1	.....	156,250	Nov. . . . 1905	.01
Doctor-Jack Pot Con., g, Colo	3,000,000	3,000,000	1	.....	267,000	July. . . . 1906	.00½
Doe Run, l, Mo.	10,000,000	59,062	100	59,062	1,106,134	Apr. 15. . 1907	.50
Elkton Con., g, Colo.	3,000,000	2,500,000	1	75,000	1,570,200	Apr. 24 . 1907	.01½
El Paso, g, Colo	2,500,000	2,500,000	1	.....	1,242,045	Dec. 24. . 1906	.02
Empire, z, Wis.	30,000	500	60	25,000	230,000	May 15 . 1907	10.00
Federal Sm., com., Idaho	10,000,000	60,000	100	300,000	2,073,750	Apr. 15 . 1907	5.00
Federal Sm., pf, Idaho	20,000,000	120,000	100	210,000	2,674,250	Mar. 15. . 1907	1.75
Florence, s, Mont	2,500,000	400,000	5	.....	223,780	Mar. . . . 1900	.05
Frances Mohawk, g, Nev	1,000,000	910,000	1	182,000	318,500	Apr. 1. . . 1907	.10
Free Coinage, g, Colo.	1,000,000	10,000	100	.....	160,000	Dec. . . . 1902	.20
Gemini-Keystone, Utah	500,000	5,000	100	.....	1,550,000	Dec. . . . 1906	10.00
Gold Coin of Victor, Colo.	1,000,000	1,000,000	1	.....	1,230,000	Jan. . . . 1903	.01
Gold Dollar Con., g, Colo	2,500,000	2,500,000	1	.....	25,000	Dec. 15. . 1906	.00½
Gold King Con., g, Colo	6,000,000	5,750,370	1	.....	1,197,334	Dec. . . . 1905	.01
Good Hope, g, s, Colo	50,000	500	10	.....	150,000	Nov. . . . 1906	.25
Granby Con., c., B. C	15,000,000	135,000	100	810,000	2,563,360	June . . . 1907	3.00
Grand Central, g, Utah	250,000	250,000	1	70,000	1,228,750	May 15 . 1907	.04
Grass Valley Exploration, Calif	100,000	30,000	2	.....	30,000	Jan. . . . 1900	.25
Greater Gold Belt, g, Colo.	5,000,000	3,800,000	1	.....	76,000	June. . . . 1900	.02
Gwin, g, Calf.	1,000,000	100,000	100	.....	941,250	Jan. . . . 1903	.25
Homestake, g, S. D	21,840,000	218,400	100	436,800	16,080,350	Apr. 25. . 1907	.50
Horn Silver, g, s, c, z, l, Utah	10,000,000	400,000	25	20,000	5,602,000	Mar. 30. . 1907	.05
Imperial, c, Ariz	5,000,000	500,000	10	200,000	300,000	June 25 . 1907	.20
Independence Con., g, Colo.	2,500,000	2,500,000	1	.....	281,375	Apr. . . . 1901	.04
Ingham Con., g, Colo	750,000	1,359,000	½	.....	33,981	Aug. . . . 1901	.00¼
International Nickel, pf, U. S.	12,000,000	89,126	100	267,378	802,130	May 1. . .1907	1.50
Iowa, g, s, l, Colo.	1,666,667	1,666,667	1	.....	405,505	Oct. . . . 1904	.01
Iron Clad, g, Colo	1,000,000	1,000,000	1	.....	50,000	Nov. . . . 1906	.05
Iron Silver, Colo	10,000,000	500,000	20	200,000	3,750,000	April 1. . 1907	.20
Isabella, g, Colo	2,250,000	2,250,000	1	.....	742,500	Mar. . . . 1901	.01
Jamieson, g, Calif.	3,900,000	390,000	10	23,400	84,000	Apr. 18 . 1907	.03
Katinka, g, Colo	1,000,000	1,000,000	1	.....	10,000	Nov. . . . 1901	.01
Kendrick & Gelder Sm., Colo	1,000,000	1,000,000	1	.....	20,000	Dec. . . . 1901	.01
Kendall, g, Mont.	2,500,000	500,000	5	75,000	1,290,000	May 23 . . 1907	.03
Kennedy, g, Calif.	10,000,000	100,000	100	.....	1,801,001	June. . . . 1900	.05
La Fortuna, g, Ariz.	250,000	250,000	1	.....	1,200,500	Oct. . . . 1902	.05
Lake City, Colo.	50,000	50,000	1	.....	63,875	May. . . . 1900	.02
Last Dollar, g, Colo	1,500,000	1,500,000	1	.....	12,500	Dec. . . . 1905	.01
Lexington, g, Colo	1,250,000	1,250,000	1	.....	110,857	Jan. . . . 1906	.15
Liberty Bell, g, Colo	700,000	130,551	1	.....	331,179	June. . . . 1906	.05
Lightner, g, Calif.	125,000	102,225	1	.....	240,000	Mar. . . . 1903	.02

NAME AND LOCATION OF COMPANY.	Author-ized Capital Stock.	Shares Issued.	Shares Par Val.	Dividends Paid in 1907	Dividends Total to Date.	Dividends Latest Date.	Dividends Latest Amt.
Lucky Budge, z, Mo.	40,000	400	100	.....	46,800	Apr. . . . 1905	12.00
Lyon, z, l, Mo.	50,000	4,585	10	.....	2,117	Jan. . . . 1905	.20
Mammoth, g, s, c, Utah	10,000,000	400,000	25	.....	2,140,000	Dec. 20. . 1906	.05
Mary McKinney, g, Colo.	1,500,000	1,304,252	1	78,256	801,766	Apr. 25. . 1907	.03
Midget, g, Colo.	1,000,000	1,000,000	1	.....	195,000	Apr. . . . 1902	.15
Miller, Colo.	3,000,000	30,000	100	6,000	16,500	Jan. 31. . 1907	.03
Modoc, g, s, Colo.	500,000	500,000	1	.....	270,000	Dec. . . . 1903	.01
Mohawk, c, Mich.	2,500,000	100,000	25	400,000	900,000	Jan. 10. . 1907	4.00
Monitor, Idaho	1,000,000	1,000,000	1	9,200	9,200	Feb. . . . 1907	.01
Mont. Ore Purchasing, g, s, l, Mont.	2,500,000	81,000	25	1,215,000	9,448,119	Jan. 29. . 1907	15.00
Montana Tonopah, g, Nev.	1,000,000	885,000	1	.....	131,250	Aug. . . . 1905	.10
Morning Star Drift, g, Calif.	240,000	2,400	100	.....	854,400	Sept. . . . 1900	3.00
Mt. Diablo, s, Nev.	5,000,000	50,000	100	.....	260,271	Jan. . . . 1900	.10
Mt. Rosa, g, Colo.	1,000,000	994,850	1	.....	19,897	Nov. . . . 1905	.01
Napa Con., q., Calif.	700,000	100,000	7	.....	1,800,000	Oct. . . . 1902	.10
National Lead, com, U. S.	15,000,000	150,000	100	487,500	2,128,986	July 1 . . 1907	1.25
National Lead, pf, U. S.	25,000,000	250,000	100	875,000	17,407,580	June 15 . 1907	3.75
Nevada Hills, g, Nev.	5,000,000	750,000	5	75,000	150,000	Mar. 20. . 1907	.10
Nevada Keystone, g, Nev.	1,000,000	638,877	1	.....	61,700	Feb. . . . 1904	.03
Nevada King, Nev.	1,000,000	500,000	1	10,000	10,000	Apr. 25. . 1907	.02
New Century, z, Mo.	150,000	150,000	1	7,500	200,300	May . . . 1907	.01
New Idria, q, Cal.	500,000	100,000	5	40,000	920,000	Apr. 1. . . 1907	.20
New Jersey, z, U. S.	10,000,000	100,000	100	600,000	10,200,000	May . . . 1907	3.00
New Leadville Home, g, Colo.	2,000,000	2,000,000	1	.....	265,500	Feb. . . . 1902	.05½
New Zealand Con., g, Colo.	1,000,000	675,000	1	.....	129,600	Mar. . . . 1902	.01
North Butte, c, g, s, Mont.	9,000,000	400,000	15	1,600,000	5,000,000	June 25 . 1907	2.00
North Star, g, Cal.	2,500,000	250,000	10	50,000	1,356,356	Mar. 28. . 1907	.20
Northern Light, g, s, Utah.	2,000,000	400,000	5	.....	20,000	Feb. . . . 1904	.05
Nuggett, g, Colo.	1,000,000	991,000	1	.....	84,730	July. . . . 1901	.01
Old Colony Zinc, Mo.	1,000,000	69,909	10	.....	138,184	Nov. . . . 1901	.25
Old Gold, g, Colo.	2,101,150	2,101,150	1	.....	10,506	Mar. . . . 1904	.00½
Ontario, s, l, Utah.	5,000,000	50,000	100	.....	14,962,500	Dec. . . . 1902	.30
Ophir, g, s, Nev.	302,400	100,800	3	.....	1,797,400	July. . . . 1904	.25
Osceola, c, Mich.	2,500,000	96,150	25	576,900	6,362,000	Jan. 24. . 1907	6.00
Osceola, l, z, Mo.	500,000	98,000	5	39,200	225,400	Apr. 25. . 1907	.10
Ouatomah, g, Cal.	250,000	250,000	1	.....	12,500	Mar. . . . 1904	.05
Parrot, c, Mont.	2,300,000	229,850	10	114,924	6,864,720	June 19 . 1907	.25
Pennsylvania Con., g, Cal.	5,150,000	51,500	100	.....	326,125	Mar. . . . 1906	.10
Penn-Wyoming, c, Wyo.	10,000,000	5,500,000	1	137,500	531,250	Apr. 15. . 1907	.01¼
Petro, g, s, Utah.	800,000	800,000	1	.....	65,000	Aug. . . . 1906	.04
Plumas-Eureka, g, Cal.	1,406,250	150,625	10	.....	2,831,294	Apr. . . . 1901	.06
Portland, g, Colo.	3,000,000	3,000,000	1	240,000	7,387,080	Apr. 25. . 1907	.04
Quartette, Nev.	1,000,000	100,000	10	30,000	355,000	Mar. 30. . 1907	.15
Quicksilver, pf, Cal.	4,300,000	43,000	100	.....	1,931,411	May. . . . 1903	.50
Quincy, c, Mich.	3,750,000	150,000	25	1,350,000	17,945,000	June 10 . 1907	4.50
Quincy, l, s, g, c, Utah	75,000	125,000	½	.....	1,100,000	Mar. . . . 1902	1.50
Raisbeck Fairplay, z, Wis.	12,000	12,000	1	.....	1,200	June. . . . 1906	.10
Richmond, g, s, l, Nev.	1,350,000	54,000	2	.....	4,453,797	Dec. . . . 1900	.01
Red Bird, g, s, c, l, Mont.	1,500,000	300,000	5	.....	72,000	Dec. . . . 1904	.01
Red Metal, Mont.	1,000,000	100,000	10	400,000	1,200,000	Mar. 1. . 1907	4.00
Red Top, g, Nev.	1,000,000	1,000,000	1	.....	50,000	Feb. . . . 1906	.05
Rob Roy, z, Mo.	15,000	14,325	1	.....	11,969	May. . . . 1906	.03
Sacramento, g, Utah.	5,000,000	1,000,000	5	.....	308,000	Dec. . . . 1906	.00½
St. Joseph, l, Mo.	20,000,000	1,000,000	10	150,000	5,138,357	Mar. 15. . 1907	.15
Santa Rita, g, Colo.	1,000,000	1,000,000	1	.....	4,000	July. . . . 1900	.02
St. Rose, z, Wis.	75,000	750	100	.....	22,500	May. . . . 1906	6.00
Shannon, c, Ariz.	3,000,000	300,000	10	150,000	450,000	Mar. 30. . 1907	.50
Silver Hill, g, s, Nev.	180,000	180,000	1	.....	32,800	Mar. . . . 1906	.05
Silver King, g, s, l, Utah.	3,000,000	150,000	20	150,000	10,900,000	Mar. . . . 1907	.33½
Silver Shield, g, Utah.	300,000	300,000	1	.....	4,500	Feb. . . . 1901	.00½
Smuggler, s, l, z, Colo.	1,000,000	1,000,000	1	.....	2,235,000	Nov. . . . 1906	.03
Snowstorm, Idaho	1,500,000	1,500,000	1	135,000	225,000	Apr. . . . 1907	.03
Southern Boy, g, Colo.	1,250,000	875,000	5	.....	17,500	May. . . . 1900	.02
Standard Con. g, s, Cal.	2,000,000	178,394	10	17,839	4,240,597	Mar. 26. . 1907	.10
Standard, c, Ariz.	500,000	400,000	1	.....	40,000	Sept. . . . 1902	.50
Stratton's Cripple Creek, Colo.	2,000,000	2,000,000	1	50,000	100,000	Mar. . . . 1907	.02½
Stratton's Independence, g, Colo.	5,500,000	1,000,007	5	.....	5,028,568	Dec. . . . 1906	.12½
Stratton's Leasing, Colo.	500,000	500,000	1	.....	50,000	Jan. . . . 1906	.10
Strong, g, Colo.	1,000,000	1,000,000	1	.....	2,275,000	July. . . . 1905	.02½
South Swansea, g, s, l, Utah.	300,000	300,000	1	.....	170,000	Apr. . . . 1904	.01
Swansea, s, l, Utah.	500,000	100,000	5	5,000	334,500	Mar. 20. . 1907	.05
Syndicate, g, Cal.	100,000	100,000	1	.....	82,000	Aug. . . . 1902	.02
Tamarack, c, Mich.	1,500,000	60,000	25	180,000	9,180,000	Jan. 24. . 1906	3.00
Tennessee, c, Tenn.	5,000,000	200,000	25	250,000	1,125,000	Jan. 28. . 1907	1.25
Tetro, g, l, Utah.	300,000	300,000	1	.....	18,000	Dec. . . . 1904	.01
Tomboy (New), g, s, Colo.	1,500,000	300,000	5	.....	1,803,000	Dec. . . . 1906	.50
Tonopah-Alpine, g, Nev.	700,000	700,000	1	.....	70,000	Dec. . . . 1903	.10
Tonopah-Belmont, g, Nev.	2,000,000	1,150,000	1	115,000	356,500	April 1. . 1907	.10
Tonopah Extension, g, s, Nev.	1,000,000	928,433	1	.....	278,530	Apr. . . . 1906	.15
Tonopah, g, s, Nev.	1,000,000	1,000,000	1	700,000	2,650,000	Apr. 22. . 1907	.35
Tonopah-Midway, g, Nev.	1,000,000	1,000,000	1	50,000	250,000	Jan. 1. . . 1907	.05
Town Topics, g, s, Colo.	1,000,000	1,000,000	1	.....	50,000	Nov. . . . 1903	.00½
Trimountain, c, Mich.	2,500,000	100,000	25	.....	300,000	June. . . . 1903	1.50
Trinity County, g, Cal.	1,000,000	99,003	10	.....	34,561	July. . . . 1903	.05
Uncle Sam Con., Utah.	500,000	500,000	1	.....	145,000	Dec. . . . 1906	.01
Union, g, Colo.	1,250,000	1,250,000	1	.....	444,244	Jan. . . . 1903	.02
United, c, pf, Mont.	5,000,000	50,000	100	150,000	1,500,000	May 15. . 1907	3.00
United, c, com, Mont.	45,000,000	450,000	100	1,687,500	5,337,500	Apr. 29. . 1907	1.75
United, z, l, pf, Mo.	1,000,000	14,556	25	14,556	196,971	Apr. 15. . 1907	.50
United, z, l, com. Mo.	5,000,000	92,400	5	.....	27,490	Oct. . . . 1903	.05
United (Cripple Creek), Colo.	5,000,000	4,009,100	1	.....	280,071	Apr. . . . 1905	.00½
United Globe, c, Ariz.	2,300,000	23,000	100	.....	299,000	June. . . . 1906	6.50
United Metals Selling, U. S.	5,000,000	50,000	100	1,375,000	4,875,000	Apr. . . . 1907	7.50
United Verde, c, Ariz.	3,000,000	300,000	10	1,125,000	22,720,322	May . . . 1907	.75
U. S. Red. & Ref., com, Colo.	6,000,000	59,188	100	.....	414,078	Oct. . . . 1903	1.00
U. S. Red. & Ref., pf, Colo.	4,000,000	39,458	100	1,183,740	1,716,749	July . . . 1907	1.50
U. S. Sm., Ref. & Mg., com, U. S., Mex.	37,500,000	750,000	50	656,250	656,250	Apr. 15. . 1907	.87½
U. S. Sm., Ref. & Mg., pf, U. S., Mex.	37,500,000	469,748	50	822,058	1,967,528	Apr. 15. . 1907	.87½
Utah, s, l, Utah	1,000,000	90,000	10	13,500	242,000	May 14 . . 1907	.03
Utah Con., c, Utah.	1,500,000	300,000	5	1,350,000	6,486,000	Apr. 15. . 1907	1.50
Victoria, g, s, l, Utah.	250,000	250,000	1	30,000	192,500	May 15 . . 1907	.04
Vindicator Con., g, Colo.	1,500,000	1,500,000	1	90,000	1,605,000	Apr. 25. . 1907	.03
Wasp No. 2, g, S. D.	500,000	147,900	1	.....	240,595	Dec. . . . 1906	.01
West Mt. Placers, Utah.	500,000	248,300	1	.....	180,390	June. . . . 1906	.01
Wolverine, c, Mich.	1,500,000	60,000	25	600,000	4,530,000	Apr. 1. . . 1907	10.00
Work, g, Colo.	1,500,000	1,500,000	1	15,000	105,000	Apr. 1. . . 1907	.01
Yak, Colo.	1,000,000	1,000,000	1	60,000	767,685	Mar. 25. . 1907	.06
Yankee Con., g, s, l, Utah.	500,000	500,000	1	15,000	167,500	Jan. 21. . 1907	.03½
Yellow Aster, g, Cal.	1,000,000	100,000	10	10,000	593,000	May 4 . . 1904	.10
Zoe, g, Colo.	500,000	1,500,000	1	.....	7,500	Dec. . . . 1900	.00

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(Continued on Page 31.)

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The total production of marketed fluorspar in 1906 is reported by the United States Geological Survey in an advance chapter from "Mineral Resources of the United States, calendar year 1906," at 40,796 short tons, valued at $244,025. These totals are less than those of 1905, which surpassed all previous records in quantity and average value per ton. The decrease in 1906 was perhaps due to overproduction in 1905, resulting in surplus stocks which were sold in 1906, for at the close of 1906 the tendency of demand and prices was reported to be upward.

Considerable fluorspar is imported at the present time, but the market is practically limited to the Atlantic coast, as the cost of freight from English seaports to points west of New York tends to restrict the trade. English fluorspar has heretofore been cheap, at times selling at a price below the present cost of production, the shipments having been made from refuse dumps or abandoned lead mines, besides being brought to America as ballast, duty free. The local and American demand will probably consume these English fluorspar mill-tailings within a few years, and thenceforth the material cannot be profitably exported to America, as the mines are closed.

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(Continued from Page 29.)

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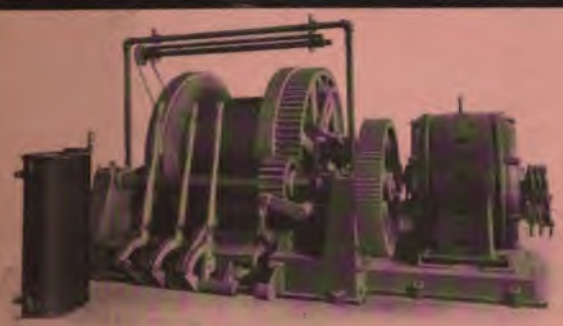

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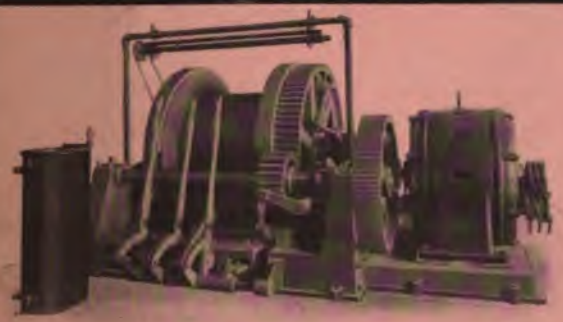

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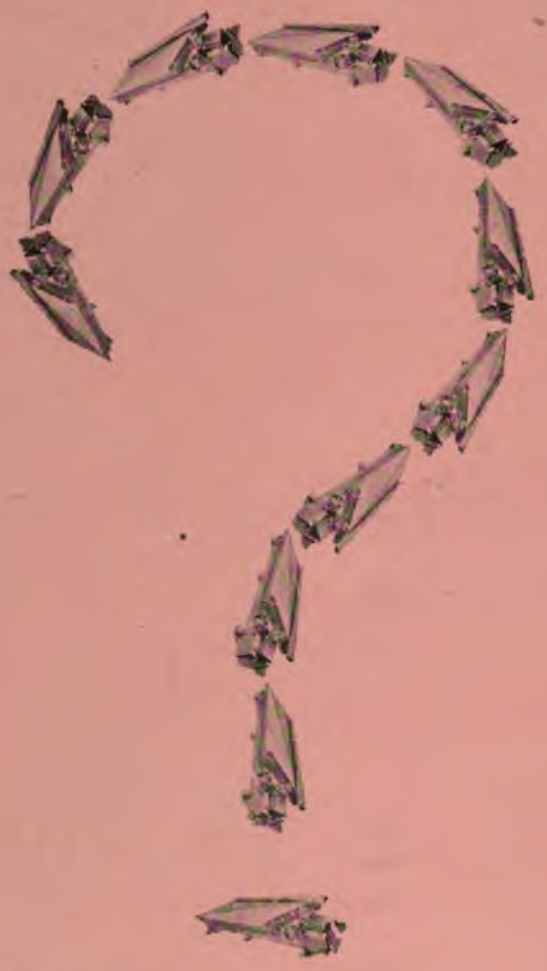

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Copper Manipulated

The boards of directors of all the subsidiary companies of the Amalgamated Copper Company met in New York a few days ago and took up the question of a reduction of the mine output. At about half past three o'clock, p. m., the hungry newspaper men were let into the president's office, where the following statement was made:

"The boards of directors of the various subsidiary companies of the Amalgamated Copper Company met to consider the copper metal situation. It was unanimously agreed that each company should curtail its output one-half. The curtailment is to go into effect at once.

"If the situation remains as it is, the output will be made commensurate with the situation. On the other hand, if the copper metal situation improves, production will be increased.

"Practically no copper is being sold at the present moment. It is not business to produce copper and store it."

The officer who gave out that statement amplified it by saying that if necessary every mine owned or controlled by the Amalgamated Copper Company will be closed. He said that for thirty days the trust mines have produced practically no copper. He could not tell what the policy of Senator Clark will be in respect to his mines, but he assumed that they will continue working. He did not believe that the present situation is due to any combination on the part of consumers to cease buying it in order to reduce prices, nor had he heard of any pool to look after the surplus copper.

He attributed much of the trouble in the copper section of the country to the beet-sugar industry. He said the beet men were monopolizing railroad cars at the time they were needed for the transportation of coal to the mines.

He also made some remarks in respect to the labor situation, saying that miners preferred to work on the farms or in other outdoor employment during the summer, when they should be in the coal mines, producing coal, in order that the railroad companies might be able to transport it at that period of the year, when they have plenty of cars to spare. As a result of that, the mines begin to produce coal when the miners return in the fall and when the railroad companies are inundated with freight from industries like the beet sugar and the moving of crops.

Notwithstanding the official statement, it was learned from an authoritative source that the actual reduction of the copper output is to be 60% immediately and that on October 1st all the mines of the Amalgamated are to be closed unless the situation in the metal market improves materially.

It is hinted that there may be a "nigger in the woodpile." The big guns may have it in mind to get rid of the little ones. In other words, it is probably a deep-laid plot to freeze out a lot of small stockholders or take over their holdings at a nominal sum and send them adrift.

There has been no decrease in the demand for copper, while its production has gradually been falling off for the past eight months. The copper magnates see an opportunity to let out a lot of the little fellows, depress the prices of copper properties outside of the ring and buy them in at a low figure. There is no legitimate excuse for the falling price of metallic copper or the closing down of copper mines. The great staple is being manipulated by unscrupulous speculators. The legitimate call for copper is greater than the ability of the country to supply, and there is a steadily increasing demand for it the world over. Copper ranks next to iron and steel among the great metallic staples of the industrial world, and as long as electricity plays an important part in human affairs there will be no alarming diminution in its demand.

Fighting for Asphaltum

Quite a siege of litigation has developed over some rich asphaltum beds in Grand county, Colorado, and the matter is up to the Court of Appeals. It involves the question as to whether a corporation has the right to take asphaltum beds as lode claims or placer locations, and the decision will establish a precedent. The court's decision will also settle a dispute which has been going on since 1898, and was brought about because each side charged the other with chasing the lo-

cators off at the point of Winchesters.

The asphaltum bed is at least worth $50,000 and both sides are fighting to the bitter end. The company has already removed about 2,000 tons and received $35 per ton for it. W. F. Webb, located a placer mining claim in the beds eighteen miles from Granley, on the Moffat road, in 1898, and immediately afterwards the American Asphaltum Company, composed of Georgetown capitalists, located a lode claim. The latter found great chambers of asphaltum, some of it from fifteen to eighteen feet wide, of solid material and they immediately shipped a number of carloads of it.

The litigation developed the claim that the asphaltum beds were located on the state school lands, but the final survey showed that the school lands were at least a mile away from the beds. The American Asphaltum Company won the fight in the lower courts, Judge Lewis holding that the lode claim of the company was proper, and Webb appealed.

There are no other mineral deposits in the placer claims except the asphaltum. The beds are the only ones of the kind in Colorado and efforts have been made to find more just like them. The whole of Grand county has been searched for similar deposits by the American Asphaltum Company, but without results.

Extensive asphaltum beds are as valuable as gold mines, and they are being eagerly prospected for throughout this entire Rocky Mountain country.

Owner of the Alvarado Mine Has to Borrow Money

From New York come reports that Pedro Alvarado, the former Mexican peon, who took $20,000,000 out of the Alvarado mines at Parral, Mexico, and astonished three continents by his lavish display of wealth, is now in debt and has been compelled to involve his famous mine in order to raise money for his pressing necessities.

His creditors have prevailed upon him to lease the great property, and through the efforts of George C. Beckham, a banker of Parral, and James F. Flynn, a mining expert, a way was suggested by which Alvarado could raise the funds he required. Mr. Flynn came to New York and interested Joseph A. Coram of Boston, a mining capitalists.

Mr. Flynn said the Mexican was willing to lease the mine, but he would not sell or mortgage it. As a result of negotiations, the lease was signed on Friday last.

The former peon immediately received $100,000 of American gold, or $200,000 Mexican money, a sum which a year ago he thought nothing of. In return the Coram syndicate obtains 55% of the net profits, the balance going to Alvarado. Mr. Coram also has loaned him $300,000, to be paid back when the mines are in operation.

No one, not on the inside, seems to understand why Alvarado should be so heavily in debt. He was extremely lavish with his money, but one would hardly think he could get rid of fifteen or twenty millions in two or three years unless he was a good gambler.

Eighteen months ago it was rumored that he proposed to assume the national debt of Mexico, which amounts to several hundred millions. Probably the sharpers down there took him in, as the spider does the innocent fly.

A Great Waste of Timber

Every person in the United States is using over six times as much wood as he would use if he were in Europe. The country as a whole consumes every year between three and four times more wood than all of the forests of the United States grow in the meantime. The average acre of forest lays up a store of only ten cubic feet annually, whereas it ought to be laying up at least thirty cubic feet in order to furnish the products taken out of it. Since 1880 more than 700,000,000,000 feet of timber have been cut for lumber alone, including 80,000,000,000 feet of coniferous timber in excess of the census in 1880.

These are some of the remarkable statements made in Circular 97 of the forest service, which deals with the timber supply of the United States and reviews the stumpage estimates made by all the important authorities. A study of the circular must lead directly to the conclusion that the rate at which forest products in the United States have been and are being consumed is far too lavish, and that only one result can follow unless steps are promptly taken to prevent waste in use and to increase the growth rate of every acre of forest in the United States. This result is a timber famine. This country is today in the same position with regard to forest resources as was Germany 150 years ago. During this period of 150 years such German states as Saxony and Prussia, particularly the latter, have applied a policy of government control and regulation which has immensely increased the productivity of their forests. The same policy will achieve even better results in the United States, because we have the advantage of all the lessons which Europe has learned and paid for in the course of a century of theory and practice.

Lest it might be assumed that the rapid and gaining depletion of American forest resources is sufficiently accounted for by the increase of population, it is pointed out in the circular that the increase in population since 1880 is barely more than half the increase in lumber cut in the same period. Two areas supplying timber have already reached and passed their maximum production—the Northeastern states in 1870 and the lake states in 1890. Today the Southern states, which cut yellow pine amounting to one-third the total annual lumber cut of the country, are undoubtedly near their maximum. The Pacific states will soon take the ascendency. The state of Washington within a few years has come to the front and now ranks first of all individual states in volume of cut.

At present but one-fifth of the total forest area of the United States is embraced in national forests. The remaining four-fifths have already passed or are most likely to pass into private hands. The average age of the trees felled for lumber this year is not less than 150 years. In other words, if he is to secure a second crop of trees of the same size, the lumberman or private forest owner must wait, say, at least one hundred years for the second crop to grow. As a rule, such long-time investments as this waiting would involve do not commend themselves to business men who are accustomed to quick returns. But the states and the nation can look much farther ahead. The larger, then, the area of national and state control over woodlands, the greater is the likelihood that the forests of the country will be kept permanently productive.

In flotation processes for separating the mineral constituents of ores, the ore finely crushed, is charged into an acidulated bath of water in a vessel similar to the ordinary spitzkasten employed in dressing works. The heavier minerals float to the surface, while the lighter minerals sink to the bottom of the tank, whence they are drawn off. This extraordinary result is effected by the action of the acid in the water upon certain minerals in the ore, leading to the evolution of gas, chiefly carbon dioxide, the bubbles of which selectively attach themselves to certain minerals, of the ore, giving them a bouyancy which causes them to float to the surface, where they accumulate as a scum readily removeable, and in this way enable a separation to be made. The flotation process is comparatively cheap.

The Story of Pioche

(By James W. Abbott.*)

In the fall of 1863 some Piute Indians in a spurt of enterprise quite unusual among the wretched tribe went to visit William Hamblin at his ranch in Santa Clara, four miles west of St. George, Utah.

Hamblin was one of those practical missionaries sent out by that great leader of men, Brigham Young, to live and labor among the Indians, teach them thrift, instruct them in agriculture and win their good will. He spoke their language fluently, had acquired their confidence and they had come to rely on his aid in all their affairs.

These Indians had brought with them in a deer skin sack some "panacare" as they called it, and which in their language meant "silver ore." They told him it was very rich; richer than any at Virginia City, where they had often been and about which Hamblin had read much and they proposed that if Hamblin would pay them a small sum they would guide him to the place it came from.

After much bargaining, lasting through several days, terms were agreed on and when they left Santa Clara, Hamblin went with them. Journeying towards the northwest, on the evening of the second day they pointed to the purple hills on the distant horizon and said: "There." In the mellow haze at sunset in Nevada the mountains show their greatest charm. I never see them at that hour without recalling the lines

"And care and sorrow seem at last
In memory's sunset air,
Like mountain ranges overpast,
In purple distance fair."

Perhaps William Hamblin thought of these lines that evening, as he looked upon the changing pictures which the Great Creator was painting for him on those mountains. Perhaps his fancy also made pictures which harmonized with the ones he saw. Results, important and far-reaching, were to come from this trip. Doubtless he realized the possibilities and his imagination saw things just as fair as these sunset glories.

The Discovery.

The next evening they camped in an exquisite valley. There was a spring which watered broad fields of native grasses and cottonwood trees and a stream with its fringe of willows. This beautiful oasis of green in its setting of brown, sun-baked hills was to be a most important factor in the new conditions which Hamblin and his Indian guides had come to initiate.

That evening he was told that his journey was nearly at an end. And so it proved. Before noon the following day he was breaking pieces of "panacare" from a wide vein which stood up above the surrounding rocks. His Indian wards had told him truth. Here under his eyes and his hands was the evidence.

Hamblin did not know much about mining law. In fact, at that early date such law as existed was vague and ill defined, but Hamblin knew that as discoverer he had a right to claim a certain amount of ground. That afternoon he cut a large stake, smoothed it off carefully on one side with an axe and in the most impressive phrase at his command he wrote in pencil a "Notice," warning all mankind that then and there by virtue of his rights as an American citizen he located the "Panacker" Lode.

William Hamblin soon passes out of this story. As often happens with the prospector, he realized little or nothing from his discovery. He moved with his family to a new ranch in Clover Valley, Nevada, and there died in 1871. By one of those fantastic pranks of fate, when he was dying word was brought that in his old "Panacker" claim the new owners had struck an immense bonanza and that from a shaft scarcely a hundred feet deep, with a bucket, a rope and windlass they were hoisting thousands of dollars a day.

Soon after this discovery Hamblin returned to the "Panacker" with a small party of white men, among whom were John Vandermark and Stephen Sherwood. Several locations were made. As they were going out they camped at the same spring where Hamblin and his Indians had spent the night previous to his location of the Panacker. Here on the evening of the 18th of March, 1864, they formally organized "Meadow Valley Mining District," which they defined as a rectangle sixty miles square, with the spring in the center, and situated in Washington county, Utah. Although the territory of Nevada was organized by Congress by act approved March 2, 1861, out of a portion of what had previously been the territory of Utah, the region embraced within the Meadow Valley Mining District remained a portion of Utah until Congress some years later revised the boundaries of Nevada.

Vandermark and Sherwood took samples from the Panacker, Vermillion and Creole to Salt Lake City. All three of these claims later became famous producers.

In Salt Lake City some of the samples were given to Governor Brigham Young and some to General P. E. Conner, then in command of the United States troops at Camp Douglas near that city. Brigham Young apparently took little interest in them. With that rare discernment so characteristic of the man he foresaw the effect of mining excitements upon his plans. He and his devoted followers had fled from virulent persecution in the Mississippi Valley and had sought surcease of trouble in a desert. They were transforming this desert into homes and gardens and green fields and all they asked was to be let alone to work out their destiny unmolested. He understood how mining draws the turbulent and the covetous. While he was reluctant to forego the direct advantage which mining would bring he considered such a course better than to invite the evils which would be certain to come with it.

But no such motives influenced either Vandermark nor General Conner, who were eager to take advantage of what seemed such an extraordinary opportunity. So General Conner sent some of his samples to San Francisco for assay, while Vandermark sent his to Blackhawk, Colorado, then a thriving gold camp. Returns came back, each indicating values averaging over three hundred dollars a ton, and the boom was launched.

A company, headed by Vandermark and Sherwood was fitted out in Salt Lake City and started in May of that year to the new mining fields. They traveled by wagon to the head of the divide just south of where Pioche now stands and then packed their supplies on mules to the spring from which the Spring Mine was afterwards named. Here they were soon joined by Captain Livingston and another party which had followed them from Salt Lake City.

Mormons Settle at St. George.

In May of the same year (1864) Francis Lee and his family, with all their belongings came from the Mormon settlement at St. George, driving their horses, cattle and sheep before them up Meadow Valley to its head and at the spring where two months before had been organized the Meadow Valley Mining District, they pitched their permanent tents and raised the banner of the Prophet.

*In Arrowhead Magazine.

And here that banner waves today. From their neighbor at St. George and brother in the faith, William Hamblin they heard the story of the fertile and well watered meadows, of the abundant grass on nearby hill and valley, and, last by no means least, of the Panacker Lode claim. These thrifty Mormons recognized the opportunity to establish ideal ranches in a spot toward which a goodly stream of shekels from the mines must flow, seeking in exchange the products of a land of milk and honey. The name which Hamblin had given to his claim they deemed fitting for their settlement and so they christened it "Panaca," a somewhat different phonetic interpretation of the same word which Hamblin had heard when the Indian had come to him with the "Panacare," and which he adopted for his mine.

And with an eye to windward as well some of these thrifty Mormons soon visited the new mining camp and planted a few stakes upon which their names were signed as claimants.

Those who are familiar with the characteristics of the gentle red man will not be surprised to learn that he had no sooner obtained his price for guiding William Hamblin to the rich deposits than he began to devise ways and means for working his new white neighbors to the limit. The morning after the arrival of Vandermark and his party at the spring on the mountain above the mines some Indians appeared at their camp, announced that the spring was their especial and exclusive property and demanded instant possession. The situation, which was for a time rather tense, was finally relieved by the purchase for cash of all right title and interest possessed by the savages in and to the spring aforesaid. The Indians and their boodle had not been gone long before another batch arrived, who proclaimed ownership with equal vehemence. These also had to be appeased in manner similar to the first. During the following weeks the exchequer of several bands of aboriginal pirates was reinforced by the same artful methods, until the band of miners began to feel that their drinking water was secured at champagne prices.

In July of that year the Indians also began to harass the settlers at Panaca, stealing cattle, stampeding horses and even coming into camp on thieving errands. A little later a prominent ranchman of Utah traveling alone through the country was killed a few miles from Panaca and still later some prospectors a few miles south of there.

In the fall of that year the party returned to Salt Lake City and Vandermark immediately went to New York to interest capital. In that fountain head of funds to finance new enterprises much excitement was aroused by the rich samples which Vandermark carried with him. He had little difficulty in organizing a company and having, as he supposed, arranged for the funds, he returned to the mines in the summer of 1865. But about this time Indian hostilities in some portions of the West had become very serious; the Union Pacific railroad had not yet started west from the Missouri river, the New York parties who were to furnish the money got frightened and refused to put up any more and Vandermark was obliged to suspend operations and go back to New York. This ended the first real attempt to open up the mines.

In January, 1865, John H. Ely, a prospector of considerable experience and some means, fitted up an expedition and went to the Pahranagat Valley, about sixty-five miles southwest of the Panacker Lode, and made some locations on veins carrying rich ore. The information getting out, there was a stampede in that direction and several thousand locations were staked. Then came the Indians and frightened away most of the prospectors. One W. H. Sales, the Indian agent, sent there by the United States government, and who had been a grafter after his kind, selling the flour and blankets intended for his wards and absorbing the proceeds, was said to have been the most frightened man in the bunch and to have fled so precipitately and effectually as never to be seen more in those parts.

The scare soon wore itself out, many of the prospectors returned and with them one William Raymond, who proceeded with great recklessness to invest his surplus cash in so many locations, that as one of the miners expressed it, he didn't stop until he had purchased a million feet of ground. He then went to New York on the usual errand and returned in the spring of 1866 bringing with him a five-stamp mill which he at once erected. His company was known as the "Hiko Silver Mining Company." Speaking of his career there a writer of that day says, "No company ever organized to operate mines on the Pacific Coast spent so much money and kept at it so long without results as this company."

Billy Raymond and John Ely were destined to be most important factors in the great coming camp of the region and their career at Hiko has been for that reason briefly outlined.

In the spring of 1866 Thomas Leavitt and Charles Hawkins came from Cache Valley, Utah, to the claims which had been staked by Hamblin, Vandermark and others and hauled several wagon loads of silver-lead ore to Round Valley, just above the upper end of Condor Canyon. Here they built a crude Mexican furnace and smeltered the ore running it into pots which moulded it into chunks the shape of the bottom of a milk pan. This bullion they carried away with them to Salt Lake City, but they never returned.

First Smelter Is Built.

Meanwhile the story of the rich veins in the camp above Panaca spread and in 1867 and 1868 prospectors straggled in. It was in the latter year that F. L. A. Pioche sent Charles E. Hoffman to purchase the properties which later were incorporated as the "Meadow Valley Mining Company," one of the two great mining companies which in the '70s became rivals and as famous in the mining world as the Belcher or the Crown Point.

Among the prospectors at that time were two men known as "Little Martin" and "Big Martin." From them Hoffman bought the first claims which became the nucleus of the Meadow Valley property.

Hoffman was a metallurgist who had been connected with the quicksilver mines at New Almaden in California. He brought with him from there forty Mexicans who had been working for him, and at once proceeded to erect a smelter on the hillside back of where the court house now stands. Fire brick for this smelter were brought from Glasgow, Scotland. At that time there was no road into that section except from Salt Lake and the eastern terminus of the Central Pacific was still several hundred miles west of Promontory Point, where the connection was made in May of the following year. It was to some point on the Central Pacific, probably Elko, that these brick and the castings for the smelter, all of which had come to San Francisco around the Horn, were shipped, and from this railroad point they were sent in to the mines on mule back. It was current talk at that time among the few people in the settlement that these fire brick cost a dollar a piece. This was probably no exaggeration.

For nearly a year after this first smelter was blown in, the bullion was shipped out by pack animals.

Wasteful as this method of treatment was the ore was so rich as to yield a profit and in 1869 Hoffman added another furnace to his smelting plant.

Fitzhugh Lee of Virginia was foreman for Hoffman and when Hoffman left in 1870 to go to the excitement at Silver Reef, Utah, Lee succeeded him as manager of Pioche's interests.

The new mining camp was known

as "Pioche's" and when the postoffice was established here a year later (1870) it was called "Pioche."

I have been unable to learn the name of the first postmaster, but the first advertised list of letters remaining uncalled for in the postoffice was signed "Petroleum V. Naseby." The humor of this will be appreciated only by those who remember the letters published in the Toledo Blade during the civil war, written by D. R. Locke, and signed "Petroleum V. Naseby." The humorous satire of these letters was never excelled in literature; they were potent factors in sustaining Union sentiment and their pungent ridicule made a deep impression. The fact that this name was assumed by the postmaster of Pioche suggests that he must have been an old soldier, appointed by General Grant to this office and the leniency with which this flippancy and infraction of official discipline was received shows that Pioche was a very remote settlement where the bonds of red tape were loose and also perhaps that in General Grant's term special indulgence was extended to the old soldiers who had fought under his standard.

Before the postoffice was established and mail service instituted by the government mail was carried each way between Pioche and Hamilton by private carrier who charged twenty-five cents a letter each way.

A few words about the men who were really the founders of Pioche may be interesting. F. L. A. Pioche was a native of France, who came to California with the Argonauts, prospered in mining and became a reputed multi-millionaire. When the camp which he had founded and to which he had given his name was at the zenith of its strenuous career a telegram from San Francisco told how ths old Forty-niner had become weary of life and was dead by his own hand. Successful in every important enterprise which he had undertaken, the maker of one world's most important mines, the envied of his fellowmen, in what should have been the prime of his life, he had troubles which the world knew not of and they seemed to him too grievous to be borne.

Hoffman went to Silver Reef, that geological freak which has produced millions from sandstone, prospered, finally went to Old Mexico and there in picturesque old San Luis Potosi about sixty days ago he died.

In the year 1869 a Frenchman named Chubar erected another crude smelter not far from where No. 1 hoist of the Nevada-Utah now stands. He owned a silver-lead mine called the Louise, and for a little while his smelter ran quite successfully.

It was about the first of the year 1869 that John H. Ely and William H. Raymond appeared at the new camp. They had run their career at Hiko and failed. Not to put too fine a point upon it, they were practically busted. Ely was a typical prospector and the way money will evaporate from the pockets of a prospector has become a proverb. Raymond was something like Jim Bludsoe of the Prairie Belle, who "held her nozzle agin the bank 'til the last galoot was ashore." He had steered the Hiko Silver Mining Company so long as a dollar was aboard the craft.

Ely and Raymond Arrive.

When Ely and Raymond hit Pioche's camp they were flush only in nerve and experience. Among the prospectors on the hill they found two brothers named Edward and Pat Burke, who had a claim about six hundred feet east of the Panacker. These four at once entered into negotiations. The Burke brothers wanted $8,000 for their claim and Ely and Raymond were perfectly willing to pay it. But unfortunately they didn't have the eight thousand. They did have a silver watch and some grub, and after several days of highly persuasive song and dance, the Burke brothers had acquired the silver watch and 800 pounds of flour and Ely and Raymond were camped beside the hole with their shot guns. An agreement had been entered into and signed to the effect that when the eight thousand should be forth-coming the claim would be theirs.

By still further practice of nerve they managed to erect a little furnace a few hundred feet east of their claim where they quickly demonstrated their inability to smelt the Burke ore.

To all mining schemers who have gone into the hole and apparently pulled the hole in after them the subsequent career of Ely and Raymond is commended as an inspiration.

Ely remained by the hole to operate the shot gun department, while Raymond betook himself to Panaca to practice the arts of eloquence upon the Mormon constituents. He addressed them something as follows: "My partner and I own the richest claim there is up in the new camp, but we need a mill to get out the values. Now the place for that mill is right here in the suburbs of Panaca. If we had it here the Mormons would get to haul the ore down, the mining camp would flourish, a mill town would spring up and every man in both camps would be a purchaser of the supplies which you raise here in this most fruitful garden spot in Utah. You would all get rich, your children could be educated at the finest schools in the land, and plenty and happiness would be your portion. Now I have the mill. It is down in Hiko in the Pahranagat Valley. I don't need it so very much down there at present, but if I had it here I would make a million dollars with it the first year, and you people would get the biggest part of it." The Mormons listened with interest. They were not quite sure it would all come out as Raymond pictured it, but it looked pretty good to them and they liked Raymond's way. They all inspected the silver half dollar which Raymond produced and credited his statement that it was the last of his financial resources. Adjournment was had for them to confer alone and when the mutual confidence was resumed it was arranged that they would render such aid as lay in their power and that the returns should all come to them until they were fully reimbursed.

Mill Erected at Panaca.

The first process of fulfillment of this agreement was to haul ten tons of the ore from the claim to Pahranagat Valley for a test where the Mormons helped to run it through the mill. A goodly bar of silver bullion resulted. When the procession of those Mormon teams started on its return to Panaca their wagons were loaded with stamp stems, cams, tappets and paraphernalia generally of a five-stamp mill which had done its best and failed on the ores of Pahranagat Valley, but which under the name of the "Pioneer Five Stamp Mill" was to head the list of a long and complex series of devices for more or less successfully extracting wealth from the ores of a wonderful mining district.

(Continued in Next Number.)

COBALT CENTRAL STORING ORE.

Owing to the approaching completion of the 100-ton mill of the Cobalt Central Mines Company, which will be ready for operation about October 1st, the management of the company has been storing its ore in bins for several weeks, with the result that a large supply is on hand to start concentrating when the mill is ready. Up to a few months ago the company was shipping customs ores, but with its own concentrator the efficiency of the mines will be increased more than fifty per cent.

Engineers who have been examining the Gamey mine of the Cobalt Central report that the rich veins of the Coniagas mine, next adjoining the Gamey, run right through the latter property. As the Coniagas generally is considered one of the richest forty-acre blocks in the Cobalt camp, the outlook for the Cobalt Central's Gamey is promising.

Method of Purchasing Materials

By D. C. Neuman Collins.*

In buying building material there are countless methods and complications that are rarely duplicated. There are artists in every profession and trade, each offering what seems to be the most tempting proposal to get the work.

It should be kept in mind always that with complete plans, there is just so much material to be bought and just so much labor to be done, and the two together, under normal conditions should cost just so much money. If an offer is made to do the work for very much less than it should cost, it should be looked on with suspicion. If a proposal comes in to execute it for a much larger amount, it should be put aside for a fairer method.

Proposals are sometimes given in a single lump sum for the entire work, or they may be sent in as separate bids for each trade. Some will quote unit prices, so much per pound; per square foot, or per thousand, others will offer to do the work for certain percentages of the cost, and may or may not give a limit of cost and still others will agree to spend the money for a fixed fee and guarantee nothing, explaining that it is hard to beat cost prices. Some bidders boast that they will not estimate any work nor guarantee any costs, but will do the work for a fixed fee, penalizing that fee for any overrun above a fixed amount and taking a percentage of all savings made under that amount. Some bidders may propose to contract for labor only, all materials to be furnished by the owner—and so on in an unlimited variety, each one exploiting his own system as the only one to save the owner money.

These various tenders do not affect the value of the work in the slightest, but it is a complicated matter to list them for intelligent comparison. In order to classify and assess each one for its true value, we come right back to the necessity of knowing all about the quantity quality and value of the material to be bought. The time of completion is another complication entering into the proposals. The higher bidders are sometimes the ones who make the best promises.

This is the period during which everybody is amiable and friendly, and makes all sorts of promises; it is also the time to nail down all loose corners. This campaign may show the lump sum to be the best, or it may show that the general contractors are all busy and the bids on separate trades show considerable economy. There are instances where changes are likely to be made during erection of the work and unit prices will permit unlimited changes without danger of excessive bills for extra work. There are times when a percentage form of contract will look good, or fixed sum contract will have a special advantage. The success of the latter form of contract, however, depends largely upon the capabilities and diligence of the bidder in prosecuting the work economically, unless he gives a guarantee that there is no commercial inducement for him to put energy on it.

In cases where the early completion of the building is imperative it requires considerable ingenuity to assure it without paying a large premium. Very frequently the engineer prepares preliminary data from which competitive unit prices can be obtained and orders for material placed by the owner direct, without waiting for the plans to be finished in detail. In this way, material requiring considerable time to deliver can be ordered in advance and the plans can be finished and other work prepared for its erection while it is in transit.

When steel contracts are placed direct at so much per pound, it is well to have the engineer prepare the detail drawings for the shop, in order to control the number of pounds. In lumber orders the lists can be prepared by the engineer to control the number of board feet. When this is done the labor can be contracted for separately or by day work as conditions may recommend.

It should be borne in mind in splitting up contracts that there must always be a head to the administration of any contract to harmonize the varied interests, and a good superintendent acting under the engineer's instructions, will fill the bill admirably. An engineer properly trained should be in a position to relieve the owner of all this worry and to protect his interests from beginning to end through any method that the owner's interests may suggest as being most economical. In this way, an engineer's fee becomes the best possible investment and cannot be looked upon as an expense.

Many owners look upon industrial buildings as mere shells to give protection from the elements. They treat them as a single item without consideration of the multitude of details that combine to make success or failure. Frequently an owner will consider competitive figures on a building of a certain size as satisfying all demands of competition regardless of the uncertainty of what each bidder includes in his estimate and in absolute disregard of the helpless condition he will be placed in after the contractor is bound to deliver him a building and he is obliged to pay the contractor a sum of money.

The interest of an owner is not to get the cheapest building possible; it is to get the right kind of a building as cheap as he can. When an owner puts himself in the hands of a contractor who is experienced in his business, without knowing and having a clear record of what he is to get for his money, he is adopting poor business tactics, as the interests are entirely divergent in every way and the obligations generally flat. An invitation to bid in competition, if taken literally, means nothing less than a challenge to execute the work with as little material as possible and with the least amount of labor that the specified requirements legally demand. After the contract is signed, these legal records of requirements are the sole grounds for protection to the owner.

*Consulting engineer and architect. From Engrg. Mag., Sept., 1907.

PRODUCTION OF BARYTES IN 1906.

Barytes, or heavy spar (barium sulphate), is used principally as a white pigment, although it is also employed in the manufacture of paper, cloth, and rubber. It occurs in veins as a gangue of metallic ores, in veins as a sandstone and limestone, and as a replacement of limestone. Differential weathering of the limestone and the barytes has given rise to deposits of barytes embedded in residual clay. The principal deposits in the United States have been found in Missouri and in the Appalachian region, in Virginia, Tennessee and North Carolina. Smal deposits also occur in Pennsylvania, and in 1906 Alabama became a producer of this mineral. In 1906 the quantity of crude barytes mined in the United States amounted to 50,231 short tons, valued at $160,367. The value is that of the crude barytes at the mines, hand cobbled and ready for shipment. This production shows an increase in quantity of 1,996 tons and in value of $11,564 over that of 1905, which was 48,235 short tons valued at $148,803. The value per ton has advanced from $2.66 in 1904, to $3.19 in 1906. Missouri is the largest producer, Virginia being second.

San Sebastian Jalisco

H. W. Young.*

San Sebastian is located in the state of Jalisco about six hours' ride from the proposed line of the Southern Pacific railroad and is twenty-five miles from the sea port of Las Peñas, the finest harbor on the Pacific coast. Mining in this vicinity is experiencing a decided boom and at present there are upwards of fifty mines here, many of which are "antiguas" which were worked down to the water level and then abandoned because of the inability to handle the water. One mine, the Tajo, has worked continuously since 1526. This mine now belongs to the El Tajo Mining Company, an American concern capitalized at $3,500,000 and under the management of L. C. Malone. There are about 100 men on the mine payroll. The mine is an open cut 1,000 feet deep. The ore shoot is 1,600 feet in length. The company plans to work the property by means of tunnels, one of which is to be 1,700 feet in length, the other 400 feet long. Among the improvements contemplated is a six-drill compressor, a 100-ton mill and a hydro-electric plant.

The properties of the Jalisco Mining Company, a native concern have been bonded to the Navidad Mines & Reduction Company, of San Francisco, California. J. F. Buel is manager of the latter and I. J. Hall, superintendent. About 200 men are working. The group of mines owned by the Navidad Mines & Reduction Company consists of the Las Cuates, Auriola, Aguila de Oro, Quiteria, Teronera, Santa Gertrudis and several others. Of these mines the Quiteria alone produced $7,000,000 in recent years. The Los Reyes mines, located about two hours ride from San Sebastian, are steady producers.

At Real Alto, The Real Alto Mining Company is working the Santiago, Las Cruces and Peña Rajada mines. All are old Spanish mines and have fine ore in sight. These mines were unwatered by H. H. Cross and L. C. Malone during the work of examination. Average of assays from these mines run one kilo, 200 gram silver and twelve grams gold. The mines are capable of producing an immense tonnage of this grade of ore. A six drill compressor plant is to be installed. About fifty men are employed. The mines are under the management of H. H. Cross and H. W. Young is superintendent. Mr. Cross is now in the United States purchasing machinery which will include a pumping and hoisting plant.

In San Sebastian, a town of about 2,000 inhabitants, are ten large water wheels which were used to run arrastras. These, with the exception of two, are now in ruins. On every hand are evidences that this camp was the scene of great activity and prosperity in bygone years, before the water became too deep in the mines. Lacking pumping facilities the mines gradually filled with water and were abandoned.

At Santana, I. B. Parks is working the Zapote mine. Nelson and McClellan are working the Santo Domingo properties. Some thirty denouncements have been made here within the past six months. There is a good opening here for some company to establish a hydro-electric plant to supply the district with power and light. The falls in the Mascota river, nine miles distant, will furnish the necessary power.

There are three systems of ore bearing veins crossing this country. Patrick Fitzgerald, an expert mining man of wide and successful experience, and at present the head of the Lupita Mines Company, gives as his opinion that with good transportation facilities such as the railroad will give, and with cheap power, this district is bound to make a noise in Mexican mining. This opinion is shared by all who know the district and its possibilities. Six months ago there were no Americans here. Now the district is showing evidences of considerable activity. San Sebastian is the cleanest town in Mexico and enjoys a wonderful climate.

*Mexican Mining Journal.

WALL STREET AND THE WEST.

C. M. Harger in Review of Reviews.

To put it bluntly: The West has about as much interest in the operations of Wall street as it has in the gambling of Monte Carlo. It cares about as much concerning the ups and downs of stock-market securities as it cares concerning the operators at Monte Carlo. It looks upon Wall street as a gambling place, not as a business center.

Ten years ago the West was afraid of Wall street. It knew that it owed a great deal of money to the East. It feared that there might be a pressing for payment and that it could not pay. But with the coming of a series of good crops, that are yet continuing, the West began to rise above its financial difficulties; then gathered, slowly at first, but more rapidly of late, a surplus which has shown itself in increased bank deposits, better dwellings, new public structures, improvements of every sort. It adjusted its debt to the East and was independent.

So today the West looks on Wall street exactly as it looks on Monte Carlo, as a resort of gamblers whose stakes are railway and trust securities instead of ivory counters. It seems just as immaterial to the average westerner who wins or loses at the stock market game as it does whether the wheel stops on the red or on the black. Possibly the judgment is the West's opinion.

The bank deposits of the West were at their high-water mark this spring. This was the explanation of a country banker out in central Nebraska; "Out of my bank last Saturday was checked $115,000. It went to pay for land and to invest in various enterprises. Yet in the week we gained $16,000 in deposits, meaning that outsiders brought approximately $130,000 to the town. That was exceptional; it being the first of March, moving time was responsible. But the tendency for farm savings to come into the West is increasing. The farmers of Iowa, Illinois, and states of that section, have been buyers of securities of late years. They have invested in commercial paper of the better sort, and in the stocks of western railroads. The shake-up in Wall street has scared them, and they are unloading stocks and buying land or farm mortgages. This, in my opinion, is responsible for a great deal of the land craze now so exciting our section."

"Will it increase, or has it reached the maximum?"

"It may increase—but we are selling our land. The bank has taken in a great deal of land, it standing us about $40 an acre. On that basis we are netting from rents about eight per cent. Now land has gone to $70 to $75 an acre, yet the rents are no higher nor the crops larger. Consequently we are netting only a little over four per cent. I would rather take a five per cent. mortgage on the land than one-third of the crops. As I said, the land values are bringing down the interest return—but the dissatisfaction with eastern financial ideas, as the West understands them, is turning money this way, and is likely to continue to do so for some time."

With such a condition is it any wonder that the West is not greatly interested in the proceedings in Wall street?

Mining News from the Many Camps

ARIZONA

Bisbee.—In spite of the many disquieting rumors which have been current in the city concerning the laying off of a large number of men by the big operating companies, the reported declines in the price of copper, the panicky condition of the stock market and other unfavorable circumstances, a general review of the facts in the case shows that Bisbee is solid, and that general business conditions here are better than in any place that can be named. There is absolutely no foundation for the report of a shut down of the mines, and furthermore, there is no danger of the laying off of men.

Walter Douglas, general manager of the Phelps-Dodge interests in this section said:

"There is absolutely no foundation for such a report, as we are not laying off our men, and whatever may have been considered at an earlier date we do not intend to do so. I understand that a rumor is current to the effect that the Amalgamated Copper company is closing down its mines in Butte, but even if this is true, it will have no effect whatever on conditions other than a beneficial character in Bisbee."

Prescott.—A body of gold-bearing ore of very high grade was recently opened in the 500-foot level of the King Solomon. The new find is a continuation of an ore shoot, the longest ever opened in the mine. The paystreak is now the entire width of the drift and shows on the hanging wall of the drift, indicating that it is of much greater width. Free gold, visible to the naked eye, is discerned in samples taken from all parts of it. The drift is being pushed ahead and crosscut will be run to the hanging wall later to determine the size of the deposit.

On the Burrage claim, adjoining the King Solomon group, F. X. O'Brien is having a hoist installed at a 500-foot shaft, which will be unwatered. O'Brien plans to run his drifts on the vain at the 500-foot level. Some high grade ore has been mined from his claim and it is the general opinion that another good producer will be developed there.

At the camp of the Lookout Copper company, in the Slate Creek district, the work of installing the new boiler and hoisting engine, recently delivered, is being pushed, and the company is making preparations to start the development of its holdings on a larger scale than ever before. Contracts for 1,000 cords of wood have been let, to be delivered as soon as possible, and the property is being enlarged by the addition of new buildings to accommodate the large force of miners that will later be employed.

The Buffalo-Arizona Mining Company has a force of mechanics installing a cyanide plant at the Parker five-stamp mill and is making preparations to commence the development of the Parker group of mines, recently taken over under bond from S. A. Parker. The group of eighteen claims is located on the east side of Turkey station, on the Bradshaw mountain railroad. The locations cover a series of gold bearing veins, which have been considerably developed by Parker during the past three years. He installed a five-stamp mill on the ground where the output was treated, giving good returns, before the properties were taken over by the new concern.

Reports from the camp of the Redman Mining, Milling and Smelting Company are to the effect that two important strikes were made in the Redman mine, which has encouraged the management to such an extent that plans are now under consideration that may develop into the erection of a mill and the opening of the mine to a good depth.

On the 100-foot level a 30-inch vein of heavy sulphide ore has been uncovered, and in the 200-foot level 36 inches of the same character of ore has been struck in one of the drifts. Samples assayed show the average values to be about $50 to the ton.

Reliable information reached here from the Bradshaw mountains of a very rich strike of high-grade silver ore made recently by Mrs. Jennie Clarke, the pioneer woman prospector of that region. The new find was made in the vicinity of the Great Peck mine, which has a record in silver production of over $3,000,000, although its vein has never been opened to any great extent below the 600-foot level.

An extensive scheme of development is being planned by the management of the Alma-Empire Consolidated Mining Company, which recently took over under bond the Empire and Alma groups of mines, on Groom creek.

The deal followed a thorough examination made of the Empire mine after the shaft was unwatered. The Empire shaft, now about 400 feet in depth, will be sunk to the 600-foot level, and the stamp mill overhauled and some new machinery added. A pump has been ordered for the Alma shaft, which will be unwatered as soon as the pump is installed, and sunk several hundred feet deeper.

The Alma and Empire groups consist of fourteen claims, covering a series of gold bearing ledges that can be traced for some distance through the mountains, and out of which some of the highest grade ore ever mined in the district has been taken. The properties are located about six miles south of this city.

Kingman—Report coming from the Crow Canon mines is to the effect that a fine body of ore has been struck at a depth of thirty-two feet in the shaft, although it was not thought that ore would be reached until a crosscut was run at the 100 level. Handsome specimens of native copper have been taken from the shaft and much good copper ore is showing in the porphyry filling of the vein. Work is being pushed on the shaft and it is thought a depth of 100 feet will be reached early in October.

The mill of the Stockton Hill Mining Company is working perfectly and making a splendid zinc and lead product. In the upraise from the drift at the 200 level in the De la Fountaine mine there is fourteen inches of clean lead ore, while the vein shows a width of about twelve feet of milling ore. The whole ore body will give better than twenty per cent. lead.

Mining sales have been the regular thing for some time past, but recently a sale was made which eclipsed the usual ones, for the reason that it was a cash proposition and the amount ran into the one hundred and fifty thousand dollar mark.

The property in question is the Keystone group and the Charles E. Sherman group in Mineral Park district. The property was sold to the Deming Smelting Company for a cash consideration of practically $150,000. The mines are gold and silver and have been producers for some time past and are two of the most meritorious groups in the county.

Florence—E. R. Safford has returned from Los Angeles, California, where he had been on mining business, having bonded while there to a number of Los Angeles capitalists the Bobtail mine near Kelvin, belonging to J. J. Sullivan and others for $65,000. They have taken a year's working bond on the property and agree to work a stipulated force of men.

Yuma—The Big Horn people have struck it rich. They have a mine in sight beyond a doubt. Opening up a shaft on either side of a thirty-three-foot dike, they have found that the

dike widens to forty feet at a depth of ten feet. W. F. Timmons broke the footwalls at ten feet and brought samples to the city.

The assay returns have not yet been made, but that it will run between forty and fifty per cent. copper, and several dollars in gold is certain.

The stuff bristles with native copper. The pure metal sticks out all over it and many specimens are sprinkled with free gold. A mining contractor who saw it offered to do $20,000 worth of development work and take it in stock of the company, and wants a contract on those terms.

"I believe we have a second Bisbee," Mr. Timmons said. "When we begun we thought we had a gold property. We have, but we have copper worth more than gold. It looks big and we are going right after it. I think it will run between forty and fifty per cent. copper, and until we go further there is no knowing how much we have."

It develops on assays made in Yuma that the recent strike in the Mayhew Free Gold Mining Company's property at Kofa is of immense importance. The ledge of nine feet averages $49.40 instead of $25 as first thought, and kidneys from a three-inch pay streak run as high as $24,800. These kidneys occur throughout the vein in sizes as large as a man's fist.

Globe—There was a rich strike on the thirteenth level of the Old Dominion, however, but its importance has not yet been demonstrated. While drifting on No. 3 sulphide vein on the 13th, a streak of ore was encountered that is believed to be the highest grade copper ore ever discovered in the district. While the streak is only about a foot and a half wide, some samples taken from it assayed as high as seventy per cent. and the shoot will average in the vicinity of forty per cent. The ore is both glance and native copper. Another strike of native copper was reported from the mine of the Arizona National Company on Lower Pinto creek.

Jerome—Three shifts are steadily at work at the Verde Grande. A streak of soft iron has been encountered in one corner of the shaft. Sulphides prevail in all the formations taken from the shaft.

Splendid headway has been made in the development of the Hull group. A body of pay ore, the extent of which is not known, has been encountered in the Dillon tunnel.

Lorenzo B. Adams, one of the most prominent of New York's brokers, was a visitor this week. Mr. Adams has taken up the work of financiering the Jerome Arizona Copper Company. This company owns a valuable group of claims located a short distance north of Jerome.

Kelvin—The Madeline shaft on the Big Lead property at Ray has reached a depth of 300 feet and has penetrated the zone of secondary enrichment. The results were so surprising as to cause Superintendent W. B. Twitchell to climb right up into the air, and if the boys had not caught him by the heels he would have gone clear out of sight. When the first round of holes penetrating the zone of secondary enrichment were fired and the muck cleared out, the entire bottom of the shaft sparkled and gleamed with massive bunches of pure virgin copper about 1,000 fine.

If the primary or sulphuret ore bodies are not encountered immediately below this zone of secondary enrichment, it would be contrary to all mining experience of the past, hence the shaft will be continued down as fast as possible.

Superintendent Twitchell is now having trussle work constructed across Copper canon for a car track from the Madeline shaft to the concentrating plant of the old Kelvin Reduction Company, so that said mill can be operated on ore from the above named shaft. This plant will handle as much ore as does the Big Lead mill, hence inside of a few weeks the company will be milling 100 tons of ore per day and will then soon reach the dividend-paying period.

Phoenix—According to eastern advices the cost of producing copper in the Southwest will again be raised this winter. The increased cost in production will come from the raise in the freight tariff on coke, the charge of the railroads on the eastern product having been raised $1.39 per ton. The raise affects both coal and coke from Pennsylvania and West Virginia fields, the new rate being in effect from those points to El Paso.

The Old Dominion and Shannon companies are more fortunate than others in Arizona, both having laid in a large supply during the summer, for which they paid $13.50 per ton delivered. With a greatly increased production of coke at the Dawson mines of the Phelps Dodge company in New Mexico, the smelters of Arizona and Sonora will probably receive all they require in the near future without paying the exorbitant rate from Pennsylvania.

(Correspondence.)

Jerome—Two copper mines of importance to the mining and business world mark this portion of the great copper belt of the United States and Mexico. One is the United Verde, owned by United States Senator Clark. The Clark property is well known as a huge producer with its stock worth many times its par value.

The other property is the Jerome Verde and it, also, is destined to become famous. Several of the claims of the Jerome Verde adjoin the Clark land and all of its property is practically in the same formation. The company owns twenty-eight patented claims and in the main hails from the Empire state. The Jerome Verde shaft is down now about 500 feet and more than 2,000 feet of drifting and crosscutting has been done. The management has conclusively proved that it has copper in large quantities. The mine lies in a highly mineralized copper country, and with depth it will in all probability prove to be a bonanza. The ore runs from six to ten per cent. in the red metal with good showings of gold and silver. Considerable ore is on the dump and enough in sight to warrant the removal of the old smelter and erecting a new one with a capacity of 500 tons. The concensus of opinion of unbiased men who are capable of judging, and with whom the writer has conversed, seems to be that the Jerome Verde will soon become a first-class mine and a paying proposition. The work is being well done, and things look bright for the property. It is officered by careful, competent and experienced men. More than $100,000 has been expended in development work, and as it appears to the writer, well spent. Its supervising engineers are Haggott-Girand Company of Prescott, men eminent and of high standing and experience. Mr. Girand is the United States deputy mineral surveyor of Arizona.

Recently a big strike of oxy-sulphide was encountered in the Little Daisy, an extension of the United Verde, only a short distance away from the Jerome Verde on of the same lead. There is no valid reason, taking all things into consideration, why the Jerome Verde property in time should not be as good a mine as its intimate and gigantic neighbor, the United Verde.

The fiscal agent of the Jerome Verde is the general Securities Company of Los Angeles, a concern reported to be reliable in every respect.

COLORADO

ARCHULETA COUNTY.

Although there are valuable mineral deposits in the mountainous sections of this country it is noted chiefly for its extensive forests of pine, rich agricultural valleys, wide grazing ranges,

beautiful rivers and tributaries, marvelous mineral springs, fine climate and other natural resources.

The time is not distant when Archuleta county will contain a dense population of thrifty people. Valuable ore bodies have been found in her mountains, but capital and enterprise have thus far failed to develop their resources. Coal abounds in various places and at several points it is being mined for railroad and domestic purposes. Coal oil indications crop out at a dozen different points in the county, and several wells have been driven to depths varying from a few hundred feet to one thousand or more. In some of them oil was found, but not in paying quantities. In all probability greater depth would bring profitable results. When her lumber resources are exhausted men will then turn their attention to the resources of the rocks and the soil.

Extensive coal deposits abound, metalliferous ore bodies, coal oil, valuable clays and other resources of the earth. A few more years and her beautiful pine forests will have passed through the remorseless maws of a half dozen saw mills. Greedy commercialism has no respect for God's temples.

Pagosa Springs, the county seat, numbers a population of about 1,000. It is blessed with a large and well arranged school building capable of accommodating 200 school children, several churches, good hotels, the usual complement of business houses, two weekly newspapers, a bank, railroad, flouring mill, one of the largest saw mills in the state and many other industrial interests. The beautiful San Juan river flows within its borders and a dozen tributaries feed it from the mountain slopes. The town is located in a pretty park of several hundred acres, stands at an altitude of about 7,000 feet above sea level, and the most remarkable hot mineral springs bubble out of the lime formation that underlies the park the world has ever known. There are several of these springs, the larger of which has a surface area fifty by seventy-four feet, a temperature of 153 degrees Fahrenheit and of unfathomable depth. It is located on the east bank of the San Juan river within the town limits and good bathing facilities have been provided. In fact bathing houses have been erected on both sides of the river and Pagosa is becoming a noted resort.

Dr. Charles A. Smart of the United States army, and Professor D. N. Lowe of the civil service, have given the following comparative statement and analysis of these waters.

"This is believed to be the largest hot spring in the world. It is fifty by seventy-four feet in area and of unknown depth. The cures reported by those who have been afflicted are really wonderful. Rheumatism, stomach trouble, contageous affections, blood and kidney diseases have been permanently cured by the use of these waters. Sciatica and chronic cases of long standing rheumatism have been instantly relieved by taking the hot mud baths, a deposit formed by the overflow from the Pagosa, or "Healing Water," as the word signifies in the Ute language.

The waters of Pagosa are without doubt the most wonderful and beneficial in medicinal effects that have ever been discovered. The mixture, or work of Nature's Laboratory, is done for down in the caverns of the earth, and is done effectively. It is not known from what depth the hot, seethwater starts as 850 feet of rope with weight attached, has not touched bottom, nor met with any resistance, except from the upraising of water. The following is the comparative analysis of the water as given by Dr. Charles A. Smart, U. S. A.; Professor D. N. Lowe, and the United States government report of hot springs:

Grains in Litre (1.76 pints) of water.

	"Great Pagosa" Spring.	Carlsbad Sprudel Spring.)
Sodium Chloride	13.380	15.450
Sodium Carbonate	18.025	20.415
Sodium Sulphate	32.730	35.580
Calcium Carbonate	9.040	4.455
Magnesium Carbonate	1.440	1.860
Lithium Carbonate	0.710	0.000
Potassium Carbonate	0.607	0.000
Strontium Carbonate	0.000	0.012
Iron Protoxide	0.036	0.030
Maganese Protoxfde	0.042	0.009
Calcium Fluoride	0.066	0.045
Calcium Phosphide	0.007	0.003
Silica	0.155	0.108

The springs are accessible by the Denver & Rio Grande railroad, 421 miles from Denver, and with the completion of the large hotel now in course of construction, new bath houses, lawns, groves and other improvements, it will be one of the most picturesque, inviting and charming bathing resorts in this or any other country. Tall mountains look down upon it from every point of the compass, and the intervening valleys are rich in the elements of fertility.

CRIPPLE CREEK.

The Cripple Creek district reports an output for August amounting to $923,286. The figures as compiled from shipments, smelters, mills and other sources are approximately correct. Of gross bullion there was 45,213 tons valued at $923,286. These figures show a falling off from the month previous of 6,973 tons and $243,638 in value.

The loss is directly due to the destruction by fire of the plant of the Golden Cycle company at Colorado City and consequent shut-down of the mines shipping under contract thereto. Advices from the Golden Cycle management are that the premises have been cleared of the debris and reconstruction work has been commenced.

The important feature of the month was the low average grade of ore run through the solution tanks at profit by the Phoenix Leasing and Milling Company at the larger of the two mills of the Cripple Creek Homestake company on Ironclad hill. This company reports the treatment of 2,000 tons at the low average value of $1.60 a ton. The total cost of both mining and milling this ore taken from the surface deposit adjacent to the mill is reported to be but eighty-five cents a ton. The figures follow:

Plants.	Tons.	Av. value.	Gross value.
U. S. R. & R.	16,182	$24.00	$388,368
Portland	10,000	22.00	225,000
Golden Cycle	4,620	23.00	106,260
Isabella	3,150	6.00	18,900
Ironclad	2,900	2.50	7,250
Phoenix	2,000	1.60	3,200
Vindicator (experimental)	275	20.00	5,500
Smelters	4,836	53.00	156,308
Other plants, including Wishbone and Anaconda mills	1,250	10.00	12,500
Totals	45,213		$923,286

Plans are being drawn for a cyanide mill of 100 tons daily capacity to be erected at the mouth of the Goodwill tunnel in Cottontail gulch, just beyond the corporate limits of Cripple Creek. This plant will cost approximately $25,000 and be modern in every respect. R. Blanchard, lessee of the Goodwill tunnel and Ben Hur properties, and C. B. Heaton, recently from Kansas City, are at the head of this venture. Incorporation papers have been prepared.

DOLORES COUNTY.

Recent reports from this county are cheering. In fact all these San Juan counties are on the rising tide of prosperity. Ouray, San Juan, La Plata, San Miguel, Dolores, Hinsdale and Mineral counties begin to tingle with new blood and enterprise. Their vast mineral resources are waking up capital and confidence on every hand. Money is going in there, heavy companies are taking hold; extensive development is going on, new mines are being opened and equipment is steadily going forward.

Briefly we may summarize a few of the more important mining items from Rico, the mining center of Dolores county.

The Group tunnel mill of the United Rico Mines Company is being refitted preparatory to treating the milling ore

developed in the veins cut by the Group tunnel on Newman hill, among them the Ute vein, in which much of the ore is sufficiently high grade to ship. Andrew Headman, who built the Rico sampling works here ten years ago, is in charge of the work. Mr. Headman has just returned from the state of Durango, Mexico, where he erected a large plant.

As a result of a visit of inspection by President Joseph Lange of Racine Wisconsin, and H. P. Hansen, a director, it is reported that the Dunton Consolidated Mines Company will spend $50,000 more in development. The properties of this company are located at Dunton, a neighboring camp on the West Dolores river, where the ore is high grade gold and silver. The principal mine of the camp is the Emma, owned by A. E. Reynolds, the largest individual mine owner in the United States, and his brother-in-law, Richard Keller. This mine has been lately equipped with machinery for sinking and work has been started on a deep shaft to develop the lower ore bodies. The Emma has been a shipper for many years and the ore in the upper workings has been heavily drawn upon. The properties of the Dunton Consolidated are in ore and have recently been surveyed for patent.

The Rio Dolores Mining Company has decided to erect a milling plant to handle the large tonnage already developed in the mine. The mill will probably not be erected before spring, as it is the intention of the company to test various processes to determine the best and most economical method for its particular kind of ore. In addition to the large body of low grade ore in sight the company is developing a high grade copper vein, from which shipments will begin within a week. A track is now being laid from the main line of the Rio Grande Southern railroad to the ore house of the company and as soon as completed shipments will be made both to the American smelter at Durango and the Ohio & Colorado smelter at Salida.

President P. Meehan of Milwaukee and Director W. S. Cowan of Chicago have just completed an inspection of the property and the milling project is the result of their visit. They also decided to continue development on an increased scale. Next to the United Rico this is the largest developed group in Dolores county.

A body of zinc blende ore thirty-five feet thick is the latest result of development work in the Atlantic Cable claim of the United Rico Mines Company. In a raise to connect the second and third levels workmen recently encountered splotches of resin zinc and calamine, silicate of zinc. After the connection had been made a drift was started at the point where the resin zinc was found, which soon encountered the ore body on its dip. The drift is thirty-five feet below the second level, which is in ore, and the ore body is continuous from the drift to the level. A raise is being made in the west drift of the third level to prove the continuation of the ore body in that direction, which is indicated by an old surface working. This mine has been reported to contain the largest deposit of zinc blende ore, or sphalerite, in this country, and the latest development work is cumulative evidence of the fact. From the outcrop at the surface, which covers an unusually large area, to the first level of the mine there is a continuous body of ore sixty feet in thickness. In the first level a pillar of ore has been left in a stope to hold up the roof, estimated to contain $11,000 worth of ore.

The latest important project of the United Rico Mines Company is the Potter tunnel, named in honor of Mark W. Potter, a New York attorney who is a director in the company. This tunnel, which was started a week ago, is being driven into Expectation mountain through an immense blowout of magnetic iron, carrying high copper values in places, with small values in gold and silver. The blowout, which forms the west bank of the Dolores river, juts out of the mountain side for a width of 100 feet. South of the Potter tunnel, on the same blowout, are two old tunnels, from one of which copper carbonates running as high as fifteen per cent. were shipped in earlier days, a small body of which is yet to be seen near the portal. The other tunnel is highly covered with copper stain. These tunnels were abandoned years ago in the quest for the rich gold and silver ores of Newman hill and Dolores mountain. The purpose of the Potter tunnel is to explore the copper deposits of Expectation mountain at depth. The work is progressing at the rate of forty feet a week.

A recent dispatch states that the present year has brought a revival in mining throughout the entire San Juan. Every mining camp in this region is undergoing greater and more substantial activity than any corresponding period has shown since the panic of 1893.

The transformation that Rico is undergoing is probably the most pronounced of all. As far back as 1892 it was a noted producer of high grade gold and silver ore. Panic and litigation left it prostrated until the resumption of operations here last November inspired new life and hope. These operations have continuously increased and today enough men can not be had to carry on the work planned.

The United Rico Mines Company is putting on 100 men as fast as they can be had; the Rio Dolores company is looking for men; David Swickhimer, whose properties are steady shippers, is short of good miners; the Emma mine at Dunton, a neighboring camp, is trying to increase its force; there is a report that the Dunton Consolidated Company will largely increase operations, and good "single-jackers" can find employment as fast as they arrive. The same shortage is felt at Silverton, Telluride and Ouray.

GRAND COUNTY.

Although but little is said in the the public press about Grand county, considerable mining is going on there. John A. Desch, who is operating in that locality, states that some of the camps in Grand county will open the eyes of the mining men in the next two two or three years. Mr. Desch is president of the Red Gorge Tunnel and Mining Company and is pushing work there as rapidly as possible. He has visited about all the more promising mining camps of the West and thinks the Red Gorge has as good a future as the best of them.

He has found in West Copper mountain, some four miles west of the mouth of Gore canon and on the line of the Moffat railroad, immense dykes and quartz ledges, which erosion and the scoring away of softer rocks has left exposed. These later disintegrations have strewn the whole mountain side with a mass of mineralized debris and ore float. Through all this, says Mr. Desch, bold outcroppings are an easy guide to trace the immense fissure veins from one end of the mountain to the other. Some of the ores are like those of Cripple Creek, others like those found in Boulder, while sulphides such as are characteristic of Leadville mines, enter into the combination. Hornblende schists usually form the footwalls of these veins. Andesites, rhyolites, trachytes and syenities with porphyritic rock are prominent. The veins dip into the mountain.

The greatest dip or incline is at the base, lessening gradually toward the top until at the apex it is practically vertical. While no figures are given, he says the combined values in gold, silver, copper and lead make an average higher grade than is common in veins of that character. Mr. Desch proposes to crosscut all these veins by a tunnel. The five known veins have been proved up to a suffi-

cient extent to demonstrate beyond a doubt the making of a mine on one. They are now cutting the first of the series which on the surface shows a width of 200 feet. It contains all of the four metals, gold, silver, copper and lead. As high as fifteen per cent. lead, twenty-five ounces silver and fifteen per cent. copper have been obtained from the surface tests. Shipments from the first mine will be made as soon as the Moffat road is completed to the camp which is promised at an early date.

The elevation of the mountain where Mr. Desch is working is about 9,000 feet. The tunnel will be equipped with the best modern machinery including air drills. When the big power plant is completed at the mouth of the Gore canon they will connect with it and use electric power for drills, tramming and lighting. The nearest Routt county coal mines are only forty-five miles from the Red Gorge camp. The Moffat road follows the river grade through the Desch camp—135 miles from Denver—which affords an outlet for the ores to the Denver smelters. The principal office of the company is at the mine—otherwise Red Gorge, Grand county, Colorado.

LAKE COUNTY.

Very little is said about this great wealth producer. Lake county has added more wealth to the world's grand aggregate than any other equal area of the metalliferous earth for its years. And it is still pouring out its treasures like an endless tide. All around the head waters of the Arkansas are vast deposits of mineral wealth. In the forty-seven years of the county's mining life she has probably produced more than $300,000,000 worth of mineral wealth. In recent years her annual output has ranged from $12,000,000 to $15,000,000. Some of her deepest mines are now nearly 1,500 feet beneath the surface, and still they are in great ore bodies of low and medium grades. Her tonnage exceeds that of any other county in the state, and is exceeded in value only by Cripple Creek.

Recent reports from there state that the Horseshoe district, just over the range on the Park county side of the mountain, is having quite a revival. Miners, who are operating in the district, claim that it will soon take its place as a shipper of high grade ore.

A deal was completed during the week with eastern capital by L. R. Johnson for the resumption of work on the Dauntless and Eureka claims, both being close to the Hill Top and Last Chance properties, two of the large producers of a few years ago. The Dauntless and Eureka claims have been worker intermittently by leasers for a number of years and a fair tonnage of excellent ore has been shipped from both properties. The claims are developed by two incline shafts down about 100 feet, giving a depth of sixty feet, and one shaft has been sunk on the Dauntless for sixty feet. All of this work has proved up the ore horizon. The formation is lime, which is exposed, the porphyry having been scored off, revealing the bodies of lead-silver ore in the lime. The ore taken from the two properties, it can be said, came from the surface, a number of samples taken from the dumps giving returns of $20 per ton.

It is the intention of Mr. Johnston to go farther down the hill and start a new tunnel that will gain considerable depth and at the same time develop both claims. The ore will probably be shipped to the smelters at Denver, as the railway gives a rate of $2.00 per ton on $12 ore, increased in proportion to the values. If the same rate to Leadville can be obtained, which is a shorter haul, the ore will be shipped to the Arkansas Valley plant.

The New Monarch Mining Company has secured a long lease on favorable terms on the Hill Top and Only Chance, and work has already been started. This ore will be sent to the smelter at Salida and the properties will be the means of supplying a large tonnage of lead ores necessary for fluxing purposes in the treatment of refractory ores from other parts of the state. The output from the Horseshoe district is hauled by wagon to the track at Fairplay, a distance of five miles.

The August shipments from Leadville amounted to 78,000 tons. Mining men report that they are fairly well supplied with miners, and the demand for silicious ores by the smelters is active by reason of their increased capacity. All things considered the Leadville district is in good shape, and it will round out the year with an aggregate of about 1,000,000 tons and values totaling $14,000,000 to $15,000,000.

The old saying, "It is an ill wind that blows nobody good," has been verified in the case of Shanahan and partners, operating the Hopkins claim near the crest of Mount Sheridan. A few weeks ago the men arose one morning to find that a rock slide had taken place during the night and the mouth of the incline tunnel was closed. They said it was hard luck, and started in with a will to clear the debris away. When this was completed they were astonished to find that the slide had exposed a vein on the hillside several feet wide, but to work it successfully more rock had to be cleared away. In doing this the men were surprised to find timbers mixed with the debris, and after carefully working around several of them, found an opening; this was cleaned out, the contents being principally ice, and there stood an abandoned tunnel. Shanahan prospected the place and found at the breast a body of ore several feet wide, in character the same as the vein exposed by the slide, and carrying good values in lead and silver. The vein in the old tunnel is separate and distinct from the two veins now being worked. Old-timers state that the abandoned tunnel was worked way back in 1870, when the excitement was on at Mount Bross by the miners from Fairplay, and after opening the vein and finding the ore, work had to be stopped, as it could not be shipped at a profit. The timbers were in a good state of preservation, but nothing could be seen on the surface to denote that a tunnel had ever been driven into the mountain; even the dump had been washed away by the heavy snows of years. The tunnel is now being worked, and Shanahan and partners, instead of having one vein to operate on, now have three, all from a rock slide.

Work has been resumed on the old Kennebec property, Fryer hill, lying northeast of the El Paso, and good ore is being taken from several drifts.

The Big Six, on the north slope of Breece hill, continues to send out regularly shipments of a good grade of silicious ore, and for the past year the property has been successfully worked. The shoot that has been opened is practically a continuation of the old Penn, or the Bix Six shoot, as the ore channel was first opened in this property, and later the large ore body was opened in the Penn by the late S. J. Sullivan, who gained his information of the trend of the shoot by studying it in the Bix Six ground.

Leadville men recently organized the Colorado Mining & Milling Company, which controls 100 acres of patented ground on Pennsylvania mountain, near Alma. The officers are: John A. Ewing, president; Dr. A. M. MacLean, vice president; A. R. Milks of the Carbonate National bank, secretary and treasurer; directors, Dr. A. M. Maclean, Dr. J. A. Jeannott, W. E. Newton, E. J. Newton and William A. MacLean. Work will be started by the middle of the month. A shaft on one of the claims is in ore and the Hock Hocking tunnel drains the ground to a depth of 512 feet. It is probable that an electric line will be run up the gulch to connect the shaft and the Colorado & Southern switch. The terri-

tory is well timbered and the claims are located in some of the best mining ground in Park county.

SAN MIGUEL COUNTY.

Good news come up from San Miguel county. The camps over there appear to be unusually active. The Smuggler-Union, Tomboy, Liberty Bell, Black Bear, Butterfly-Terrible, Alta, Silver Pick and a dozen others of the more developed properties are on the list of profitable shippers and are working all the competent miners they can secure. This is the best season of the year for active mining and increased production. The weather is settled and brilliant, and the miners can put in their eight-hour shifts with energy and comfort. We may reasonably expect a much heavier output for the next six months than the corresponding period of the past has shown. The properties are generally well equipped and in first-class shape for steady operation and heavier output.

Recent reports from Telluride represent that the Buckeye Mining and Leasing Company, which has a five years' lease on the Butterfly-Terrible at Ophir Loop, has now been doing development work on the property for two years. Ten stamps of the mill have been kept pounding part of the time on ore encountered incidentally to the development, and for a few weeks past twenty of the stamps have been dropping, but the day is not distant when the entire thirty will be kept busy every hour in the twenty-four. For some time past a raise has been in progress to connect the fourth with the third level, a vertical distance of between 500 and 600 feet, and it is now about through. A splendid body of mineral on the Ida vein has been opened between these levels, and it will not be long until the energy heretofore centered on development can be directed to mining and treating the ore; in fact, the property could not be profitably worked for an output until the raise was put through. The leasing company is now in position to begin reaping a harvest from the large amount of money expended on the long drawn out development.

At a meeting of the stockholders a few days ago which was attended by Frank A Snell of Milwaukee and M. A. Jacobs of Beaver Dam, Wisconsin, who also are directors; James L. Brown, who has been manager since the company was organized, tendered his resignation, and V. U. Rodgers, stockholder, was appointed in his stead. Mr. Brown is also manager of the Alta mine, which demands so much of his time he could not give the Butterfly the attention he thought it deserved.

Nothwithstanding but little has been published concerning the Alta this season, from all reports this mine is making one of the best records in its history. It is worked by the Alta Mines Leasing Company, composed largely of local capitalists. During the greater portion of last year and until late in the spring of the present, the company worked as many men as could be employed to advantage on development and expended thousands of dollars in getting the property in shape for profitable production. For several months past the Alta mill, located about one mile below, has been turning out upward of twenty tons of concentrates daily which is transported to Ophir station for shipment to the smelters. In addition to this product a carload of high grade is shipped in its crude state at frequent intervals. The Alta is said to be the nearest strictly lead proposition in the district, some of the ore running sixty to seventy per cent. in that metal. The mine and mill are giving employment to from seventy to eighty-five men.

S. H. Twigg and Randall Priest have just completed the season's work on the Blue Lake lode, situated in upper Bridal Veil basin, owned by J. B. Jenkins of West Virginia, and the estate of the late George Priest. The ore streak is three feet wide and gray copper in character. A shipment of ten tons of the ore to the Salida smelter a year or so ago returned an average value of between $26 and $27 to the ton in all metals. Mineral of this grade can now be mined and concentrated, if there is a mill convenient, and shipped at a good profit. These gentlemen say they never saw so much work going on in Bridal Veil as at present. There was a score or more of prospectors in the immediate vicinity of where they were working who were locating apparently all the vacant ground they could find.

A dispatch a few days ago stated that Robeson and Carter, who have for the past two years been operating under lease quite a portion of the Smuggler-Union mines in Marshall basin, had surrendered their lease at the date of its expiration, September 1st, and the owning company is now in charge. M. R. Hansen, who operated the mill for Robeson & Carter, has been appointed superintendent of the company's mills. It is said that during the first year of their lease Robeson & Carter cleared $200,000, but the second year was not quite so profitable. We learn from the Examiner that A. S. Meldrum, B. E. Isbell and William Dunlap have taken a lease on the Contention group from the Smuggler-Union. This property has been idle for five years owing to the destruction of the tramway leading to the mills at Pandora by a snowslide. The present lessees assert that their predecessors worked in the wrong place and that they know where good mineral is to be found, and when found, the product will be treated in the Bear Creek mill.

The vein in the Contention varies in width from twelve inches to six feet, running from $8 to $30 per ton. It is a free milling gold quartz, readily amenable to amalgamation. At the Double Eagle mine Manager J. H. Litchfield is installing machine drills. The electric power line is completed. The new equipment consists of an eight by eight belt driven Gardner compressor, and a thirty-inch by six foot air receiver. There are three 6,600-volt 7½-kilowatt transformers, 220-440 secondary, and a thirty-horse power 900 revolution 440-volt sixty-cycle Bullock motor. There are three machine drills, Sinclairs for raising and stoping and a Temple for tunnel work. The upraise being put through from the Atlanta tunnel to connect with the upper workings has broken into fine ore body five feet thick which assays $28.10 per ton.

The Double Eagle is developed by over 3,000 feet of work and estimates place the amount of ore in sight at 290,000 tons, about one-fourth of which is high grade carrying better than $44 per ton; the remainder is estimated at $10 per ton. It is well to state in this connection that the working of mines and the handling of ores in Telluride district have attained a high stage of perfection. Most of the milling accomplishes a very close saving of values. Ore containing $15 to $20 per ton is considered high grade, the general range of values being between $5.50 and $12.50. Out of these products the well ordered and managed companies are making very satisfactory dividends. While the winters are long and severe, the operators have provided all requisite arrangements for producing without serious interruption.

The National Mining and Milling Company, which recently abandoned work on the Belle Champion group of mines at Sawpit, on the San Miguel river, fifteen miles below here, has transferred its interests, in the property to Rosenbell, Tracey & Co., who will immediately inaugurate active operations. The failure of the company to make the group pay is understood to have been due to milling facilities unadapted to the treatment of the ore, and not a lack of values. The gold values in the mineral are said to be

difficult to recover, and to effect a close saving of them would require the installation of an almost entirely different method of treatment from that which has been employed since the mill was constructed about eighteen months ago. W. C. Tracey, one of the new owners, is a mill-man of wide experience and has achieved an enviable reputation in the milling of ores in the vicinity of Black Hawk and Central City. Practically all the old machinery in the mill will be removed, the building remodeled, and new stamps and concentrators substituted. A cyanide plant will be constructed just below the mill, which is said to have been the only concomitant needed by the former owner to enable the payment of very satisfactory dividends, but the company was involved in financial difficulties some time before the end came and could not afford the improvement. Several carloads of machinery have already arrived at Sawpit station for the new owners, which will be conveyed to the mill building, about 200 yards distant, as rapidly as possible. Among it is the necessary appliances for a wire rope tramway to connect the mill with the mines, from one-half to three-quarters of a mile up the mountain side. The Belle Champion group comprise several claims, and it was on this property that the first rich ore was discovered in the district in 1896, and the nucleus of the great excitement that followed. There are other mines in the district fully as promising as the Champion, which could be made to yield handsome profits were they equipped with tramway and milling facilities.

James Real and J. C. Ferguson have taken a lease on a portion of the Suffolk-Globe group of mines at Ophir, and if their expectations are realized it will mature into one of the largest producers in that camp. The lease is above the tramway level, extending clear through the mountain and making connection with the workings of the Gold King mine on this side of the range in Gold King basin. Most of the ground covered by the lease is on the lode called the Cora T., which has the reputation of having produced much exceptionally rich ore. Nearly all the mineral extracted from the Suffolk-Globe in the last twenty years has been free milling to a high degree, consequently the values were saved on the mill plates by amalgamation. Mr. Real has been resident agent and manager of the property and the Suffolk forty-stamp mill for the last sixteen years, and it is logical to think he has secured a coveted piece of territory. The product will be treated at the Suffolk mill, and if it yields a profit the output will be limited only by the capacity of the plant, and if mineral of the soft character of the Suffolk it can dispose of from 175 to 200 tons in twenty-four hours.

SUMMIT COUNTY.

The districts of this county are not making any great noises but there are no idle miners laying around loose waiting for a job. In the Breckenridge district all the larger mines are under full headway and smaller ones are coming to the front every week. Around Dillon, Frisco, Kokomo and Montezuma greater activity prevails than at any time since the boom days of the '60's and '70's.

From Montezuma we have very encouraging news. A correspondent declares that the district, long neglected, is again beginning to attract the attention of investors, and already several large companies are at work. It is nearly twenty years since much active work has been done here. The panic of 1893, the demonetization of silver, the discoveries in Cripple Creek, Leadville and other places and the lack of railroad transportation, all combined to work against Montezuma. Today, however, eastern capital is again turning toward this district, and the result is that more men are at work here now than for years past.

Hardly a day has gone by within the last two months but what some representatives of eastern parties have been here, and the little hotel has always been crowded. Among the large concerns working is the Montezuma Mines-Development Company, Henry B. Clifford and company and Samuel Newhouse. The first named is of recent organization and is backed by Kansas City and Chicago capitalists. They have secured very extensive holdings in the district and are already at work. They have also secured control of the mill on the river just below the town and a pipe line is now constructing to give additional water power. This line is being laid for a distanec of 1,200 feet and is thirty inches in diameter. In the 1,200 feet the water has a fall of ninety-seven feet, thus giving about 200 horsepower. The mill is also being enlarged and remodeled, and, when finished, will have a capacity of at least 100 tons per day.

The same company has also secured valuable water rights farther down the Snake river and proposes in the spring to begin the erection of a large power plant which will furnish light and power for the mines of the district. Henry B. Clifford and company, backed by large eastern interests, are also at work here. The tram on the Bullion mine has been completed and the company is now shipping ore from here to Keystone. Other mines owned by this company are being put in such shape as will warrant the shipment of ores within a short time. The principal Newhouse property here is the Wild Irishman, where work is going on steadily. C. C. Parsons, Mr. Newhouse's Salt Lake manager, was here recently in company with some eastern stockholders looking over the property.

Another party of easterners here last week came from Kansas City. They are interested in the companies recently organized to work the Chautauqua, Sarsfield, Columbine, Erie and other well known properties in the district. It is the intention of the new owners to erect a series of trams from these mines so that the ores can be brought from the mines direct to the mill now being remodeled by the Montezuma Mines-Development Company. This will be more economical in the handling of ores, as it is estimated that with trams they can be brought from the mines to the mill for about 10 cents per ton, as against a cost of $3.50 now in packing by burro trains.

There seems but little doubt that there will soon be a railroad here. Surveyors have been at work in the district for sometime, but it is not known definitely just whom they represent. The Colorado & Southern has been asked to extend its line from Keystone and the operators have already guaranteed enough tonnage to make it a paying proposition. The Vidler tunnel, which will pierce the range near here, may also have an influence on the transportation proposition. The operators here are determined to have a railroad if following the example set by the Cripple Creek operators, they have to build it themselves.

Old timers say that with the present boom on it will be but a short time before Summit county will take second place to Leadville in the tonnage produced and that the great majority of this tonnage will be from the Montezuma district. The plans as now outlined by the new interests working here call for the expenditure of hundreds of thousands of dollars in and around this town. One outfit alone, the Montezuma-Mines Development Company, has drafted plans which call for the expenditure of nearly $1,500,000 within the next year on its immense holdings.

A recent issue of the Bulletin states that the announcement of the plans and organization of the Montezuma-Mines Development Company and the Montezuma Milling and Power Company, develops that Dr. W. C. Abbott

and Mr. W. S. Leebrick of the Little Mattie Mining and Milling Company of this district, associated with Mr. Raymond May, of Kansas City, and other prominent mining men, have entered the Summit county mineral fields and have secured holdings of vast extent and importance, says the Idaho Springs Gazette. Further and more important, it seems that their plans involve the introduction into mining operations of that district, the theories of mining which have been so highly developed in Clear Creek, and which have been brought to such perfect system in the operations of the Little Mattie mine, mill, power plant and equipment.

The Summit county proposition which has been in process of formation for months is, however far greater in magnitude than anything the gentlemen have attempted in this district. The fundamental principle and theory, however, is an application, on very broad grounds, of modern scientific methods to the mines of the old Montezuma district. They have associated with them one of the oldest and most powerful firms of mining men in the United States. Dr. Abbott and Mr. May are powers in the financial world and with their associates in this enterprise have abundance of capital for the development of the industrial system which alone is requisite to the successful mining and marketing of the large mineral deposits of that section.

Under the Montezuma Mines-Development Company there is held an area in the Montezuma district of 1,000 acres in which are included numbers of older mines largely developed and many of more recent discovery which passes all the characteristics of mineral values that have been shown in their older neighbors. The company is practically a holding company, dividing its holdings into groups with reference to their physical relationship and mutual interdependence—such groups to be separately incorporated and capitalized. The holding company will conduct development both of mines and mining facilities and preliminary promotion until they individually shall have been brought to such a standard condition that they may enter the markets upon their merits; upon intrinsic value, rather than speculative possibilities. In this purpose there is a recognition of the feasibility of giving to mining securities the same sound character that may attach to any industrial enterprise.

There are seven mining companies already formed and operations started. They are The Silver Princess Silver Mines Company, holding the Silver King mine and a group of seven allied claims. The Silver King is developed by three adit levels having an aggregate length of 2,000 feet and has ore reserves measuring from four to ten feet in width. It paid out monthly dividends at one time of $50,000 and its possibilities are not yet measured.

The Chautauqua Silver Mines Company holds twenty-five claims and has been a unit for thirty years, since it was consolidated by Senator Teller. It includes the General Teller and others of the famous mines of old Montezuma. It has a plant of machinery in good condition and is largely developed. A crosscut tunnel of 1,265 feet intersects the vein at depths up to 700 feet and there are streaks of ore in the workings from two and one-half to five feet in width which have values ranging from $20 to $35 per ton.

The Erie Silver Mines Company holds a group of twenty-five old and new claims, developed and undeveloped. Considerable development has been made and large reserves of ore are in sight.

The Columbine Silver Mines Company has fifty-three claims, including the Old Radical and several other mines with records. Some of the more recent discoveries are of most promising character. On the Radical outcrop is the most remarkable showing of ore in the district, a vein of silver-lead ore extending for 500 feet and sticking out of the ground.

The Sarsfield Silver Mines Company has twenty-three lode claims with a combined record of having produced a quarter of a million dollars. There is a splendid streak of $100-ore in the workings of the Sarsfield.

The Monta Rosa Silver Mines Company has twenty claims, 500 feet of development on the Santa Fe, and an ore body in sight in the heading levels.

The Silver Wave Mines Company has twenty-five claims with more extensive development than any of the others. The ores exist in large deposits and carry excellent values.

All the properties lie within a radius of three miles and are in the heart of the mineral region. Their selection and acquisition have required much time and close attention and have been accomplished in fulfillment of a comprehensive plan of co-ordinant development. The Milling and Power Company is an essential feature of the whole plan. It has a mill of sixty tons capacity which is being modernized.

The Snake river affords the motive force for the utmost requirements of the central power plant. The development of its power and transmission to the mills is a simple engineering problem and as compared with the erection, operation and maintenance of numerous individual plants is an immense economy of modern kind.

These concerns propose the expenditure of from $1,500,000 to $3.000,000 in their enterprises. In many ways they constitute the greatest enterprise that has ever done business in the state.

MEXICO

(Correspondence.)

Sahuaripa District.—About thirty-five miles south from Sahuaripa, the capital of a district by that name in the state of Sonora, the mines of the Cieneguita Copper Company are located. The mines were worked in the early days of the Spaniards in that part of the country, and to this day can be seen. The country is one of the richest mineral sections known, and when the proposed new railroads are completed it will take gigantic strides to the front.

The company has immense quantities of ore in sight, and a 300-ton smelter is running day and night, though not at its full capacity at the present time. The ores are of high grade, and carry besides the copper rich values in silver. Although far down in the so-called Yaqui country and seemingly away from railroads and civilization the property is splendidly managed, and ere long will be one of the best paying propositions in Sonora. It is one of the best equipped and managed mines in Mexico. Great credit is due to Mr. George Beebe, the president of the company, for the condition of things and the value of the mine. Mr. Beebe has shown wonderful executive ability in bringing the property up to its present high standard. For over fourteen years the gentleman mentioned has lived in Mexico and thoroughly understands how to manage affairs in this land of the Montezuma. At present Mr. Beebe resides in New York city., where the main offices of the company are located.

B. F. Tipton, the mine superintendent, has proved himself to be one of the best and most resourceful of men in doing his work, and he has the full confidence and respect of his employers.

The general manager of the property is the genial C. W. Howbert of Cripple Creek, Colorado, where he is well and favorably known. Mr. Howbert, also, is a man who knows how to do things right and is possessed of great executive ability and knowledge of the mining industry.

Constant systematic work, together with its great amount of high grade ore is fast making the Cieneguita one of the foremost mines in that land of rich mines.

OBITUARY

A cage being lowered into the Negaunee mine, Marquette, Michigan, last week, gave way and fell to the bottom of the shaft, 1,000 feet, killing fourteen men and seriously injuring several.

Dispatches from Chihuahua, Mexico, state that George Rose, an American mining engineer, was murdered and his wife seriously wounded by Mexican bandits at Guanajuto. Mr. Rose, who was connected with the Mexican Mining & Transportation Company, was a son of W. A. D. Rose of Benton Harbor, Michigan, and was thirty-four years old. He was graduated from the Michigan Agricultural College in 1896, and in 1900 was married to Miss Winifred McGrath of Salt Lake City. Mrs. Rose will recover from her wounds.

Charles J. Rowland of this city, who was killed a few days ago by a police automobile in charge of Chief Delaney, was a bright young man and his death has brought sorrow to the hearts of all who had the pleasure of his acquaintance. He was a prominent member of Ajax camp of the Woodmen of the World, of which he held the honorable position of consul commander. His lodge passed heartfelt resolutions of condolence, and the father, mother and other relatives have the sympathy of a host of friends. It is a sad calamity for a bright, hopeful and ambitious young man to be cut down in the vigor of his youth, leaving relatives and friends in deepest grief over his untimely death.

Dr. Timothy Willis Miles died at his home in this city last week at the age of fifty-eight years. He was one of the most distinguished physicians and surgeons in the West and had been in practice in Denver since 1875. Dr. Miles was born in Cleveland, Ohio, in 1849, and was a graduate of the eclectic medical school of Cincinnati. He was secretary of the Colorado Eclectic Medical Association and second vice president of the National Eclectic Medical Association for years. He was also a member of the Independent Order of Odd Fellows, Woodmen of the World, Sons of the Revolution and Knights of Pythias. Lately he had been suffering from an attack of cholera morbus and his weakened constitution left him susceptible to typhoid fever. Mrs. Cornelia S. Miles, his wife, survives, and also one son, Robert, 19 years of age, who is connected with the Denver Gas & Electric Company. Mrs. J. H. Haynes of 1244 Emerson street and Mrs. Marcia Corwin of 169 West Maple, with a large connection of relatives in Denver, survive with his wife and son. Dr. Miles was quite heavily interested in mining properties in different parts of the state.

John Geisel, who committed suicide at Los Angeles, California, a few days ago, was well known in Colorado, having been a resident of the state about twenty years. For sixteen or eighteen years his home was in Ouray, where he was engaged in mining. For the past seven or eight years, until eighteen months ago, he was manager of the Barstow mine, a noted property at Red mountain. He was a competent mining and mill man and stood high in his occupation. A more honest and upright man never lived. Of course, he was ambitious to dig a fortune out of the rocks, and probably would have done so had not ill health and other misfortunes come thick and fast in the last eighteen months of his life. His prospecting in the Death Valley country was a severe blow to health, physically and mentally, and he simply gave way under the great burden. The widow and two sons survive him. One son, Charles, was prospecting in California when his father died, and Clarence is mining at Victor in the Cripple Creek district. It is stated that one day the past season, while wandering in the California desert, he was overcome by the intense heat and nearly perished. That probably had a serious effect upon his mind. He was born in Baden, Germany in 1847 and came to America in 1882. Deceased has valuable mining property in Colorado and other western states. Mrs. Geisel resides in Denver and the remains will probably be buried here.

Sheriff J. C. Rutan of Telluride, San Miguel county, died at St. Anthony's hospital Wednesday night of congestion of the brain, after a lingering illness of several weeks. Sheriff Rutan was well known throughout the San Juan and had been a resident of Telluride for twenty years. He served five terms as sheriff of San Miguel county and was a brave and competent official. He was born in Warren, Ohio, was fifty-eight years of age and a single man. His father and mother have been dead for a number of years. He is survived by two brothers and two sisters. The brothers are M. L. Rutan of Lamont, Maine, and William Rutan of Warren, Ohio. The sisters are Mrs. W. H. McVay of Yankton, South Dakota, and Miss Mary Rutan of Warren, Ohio. Sheriff Rutan was highly esteemed by a host of friends and will be mourned by a wide circle of acquaintances.

C. L. Morley of Golden, Colorado, writes: "I see by Mines and Mining that a man in Goldfield, Nevada, owns a kaolin mine. If he will send a sample of the clay to the above address we will let him know what it is worth. If O. K., we can use several tons a week at the Golden Pottery Works."

The next annual convention of the International Stationary Engineers will be held in Denver, September, 1908. The Chamber of Commerce has been notified to that effect. Their last meeting closed a few days ago at Niagara Falls and was very instructive.

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CYANIDING AT THE HOMESTAKE MILLS.

The Homestake plants at Lead, South Dakota, consist of six stampmills, containing an aggregate of 1,000 stamps per day. The most interesting feature of the mill practice is the amalgamation. Each battery is provided with four fullsize plates, in series, each plate being fifty-four by 144 inches and one-eighth inch thick. The first is plain copper, the last three are silver-plated. This addition of three silver plates, giving to each ten stamps of the Amicus (240-head) mill, a total plate area of 600 square feet, and to the other mills an average of 360 square feet per ten stamps, is a comparatively recent innovation, and has proved an excellent one, increasing the recovery by amalgamation approximately $200,000 per year above the annual recovery when only one twelve-foot plate was used. The saving by amalgamation is between seventy and seventy-five per cent. The writer gives the operating costs at the cyanide plant.—M. & S. P., July, 1907, pp. 2½; illustrated 20 cents.

THE STOCK AND METAL MARKETS

Colorado Springs

September 25.—Sales opened on the exchange dull and little or nothing was done in trading. On Tuesday El Paso was stronger at 38, Isabella sold at 21 and Portland closed slightly lower without sale at 110½ bid. Wednesday trading was practically stationery. Following are the quotations:

Mines.

Stock.	Bid.
Acacia	07¼
Black Belle	02
C. C. Con.	04⅜
C. K. & N.	05
Dante	04⅝
Doctor-Jack Pot	06⅛
Elkton	49
El Paso	37½
Fanny Rawlins	05½
Findley	38
Gold Dollar	06¾
Gold Sovereign	03½
Index	02
Isabella	20½
Jack Pot	04½
Last Dollar	02
Lexington	02
Mary Cashen	01
Mollie Gibson	02¼
Moon Anchor	02⅛
Old Gold	03⅞
Pharmacist	03¼
Portland	110
Vindicator	78
Work	15¼

Unlisted.

Stock.	Bid.
Golden Cycle	40
Jennie Sample	04¼
Jerry Johnson	05½
United Gold Mines	05½

Prospects.

Stock.	Bid.
American	0075
Banner	01¼
Bob Lee	009
Buckhorn	0075
Des Moines	008
Gold	01½
Ida May	02¼
Jolly Jane	008
Keystone	01⅛
Little Nell	0075
Little Puck	01
Mary Nevin	02
Mt. Beauty	06
New Haven	01
Raven	009
Republic	007
Rose Maud	01⅞
Rose Nicol	01
St. Thomas	01¼
Teutonic	01¼

Miscellaneous.

Stock.	Bid.
Anchor	002
Black Wonder	001
Blanche	003
Cable	005
Colo. Gold Camp	003
Easter Bell	002
Flower of the West	007
Gold Hill	002
Grace	002
Hayden	002
Hummer	003
Key West.	001
Kitty	002
Lucrative	0025
Matoa	005
Marquette	002
Missouri	0065
Montreal	005
National	007
Nellie V.	0035
O. K.	005
Olive Branch	003
Pointer	005
Pythias	002
Red Spruce	002
Tenderfoot	003
Texas Girl	004
Uncle Sam	0035
Volcano	002
Wide Awake	001

Denver

Sept. 26.—Following are the sales and quotations on the Denver stock exchange today:

Stocks.	Bid.
Acacia	7⅜
Dante	4⅝
Gold Dollar	6¼
Gold Sovereign	3½
Isabella	21
Index	2
Work	15⅜
Jerry J.	5½
U. G. M.	5½
Republic	8.50
National	8.50
Banner	1¼
Mary N.	2

New York

Sept. 26.—F. Augustus Heinze, in regard to the copper situation, says: "No one can tell exactly what the future of the market will be. I think that the decline has now brought the metal to a basis where actual sales can be made.

"There is a possibility that the decline may extend a half or one full cent more, although I am inclined to believe that a proper selling basis has about been reached, and that the price of 15 cents a pound will prove attractive to many people who have been holding out. I want to say, however, that with copper at 14 or 15 cents a pound, there is plenty of money in the business for the producing companies.

"The public has forgotten, perhaps, that on the advance a few years ago, when the metal reached the price of 15 cents a pound, the newspapers began speaking about a remarkable rise, and reports were current that the Calumet & Hecla people really did not want to see the metal selling above 15 cents. Bu I know that many of the large producers sell the same way, and that well-managed mining companies were able to make a great deal of money at that rate. The reaction which the trade is now witnessing is natural under the circumstances. The fact is that the large consuming interests became so fearful that they bid up the price against one another, and purchased immense supplies.

"Of course this demand made the producing companies think they had the market in their own hands, and the result was that they held to the 25 and 26 cent basis, regardless of what was going on in the money market, and the reduced consumption demand.

'Whenever the stringency in money reached a stage where railroads were unable to sell their securities, he largest buyers of copper were obliged to restrict operations, and the demand soon fell off radically because of the inability of the transportation companies to carry on the improvements they had planned. I do not expect to see any radical improvement in the demand for the metal until the money market becomes sufficiently normal to enable a resumption of the work that had to be abandoned by so many constructive enterprises.

"The banks that have had to make advances on the bills of lading, based on shipments of copper by the producing companies through the selling agencies, have been forced to restrict fresh advances until the old loans were taken up. For this reason there has been a good deal of copper pressing on the market, which I think can now be handled around 15 cents or within one cent of that basis."

Directors of the Nipissing Mines Co. have declared a regular quarterly dividend of three per cent., payable October 21st. This calls for the payment of $180,000.

To cover this payment directors of the N pissing Mining Company (the operating concern) declared a lump sum dividend of $180,000, which is payable to the holding company, the Nipissing Mines Company. This is equivalent to $72 on each of the 2,500

shares of the Nipissing Mining Company.

Heretofore the operating company has always declared dividends which left a surplus in the treasury of the holding company, after the payment of dividends on the latter stock. Three months ago Nipissing Mining declared $80 per share.

No action was taken on electing a successor to John G. Hopkins recently resigned, but it is stated on official authority that a resident of Ottawa will undoubtedly be added to the board to represent the large holdings of Nipissing which are credited to that section.

This would be in line with the statements at the company's annual meeting held last spring that Canadian holders of Nipissing shares would be granted further representation.

As of date September 17th Nipissing's cash and cash assets totaled $805,959 as compared with $775,000 on July 1.

The Amalgamated Copper Company, in its last fiscal year, had an equity of 224,000,000 pounds in the production of its subsidiaries. A reduction of 50 per cent. in output would make its equity, based on last year's production, 112,000,000 pounds. If 15 cents a pound was received for this amount, the profit per pound, based on present cost of production of 10.5 cents a pound would be 4.5 cents. The net earnings on 112,000,000 pounds would therefore be about $5,000,000 for the next twelve months. The Amalgamated is paying to stockholders at present at the rate of more than $12,300,000 a year. Naturally a falling off in production as well as in demand will be accompanied by a corresponding increase in operating costs.

The directors of the Amalgamated Copper Company meet in the latter part of next month for the purpose of taking action on the dividend. The belief is that it will be materially reduced.

Following are the quotations:

Stock.	Bid.
Am. Copper	60¾
Am. Smelter	91⅛
Am. Smelter, pfd.	98
Ana. Copper	38

Curb.

Stocks.	Bid.
Arizona Commercial	12
American Saginaw	....
Ahmeek	....
British Col. Copper	5⅝
Black Mountain	5
Cumberland Ely	6⅜
Davis-Daly	8⅛
Denn. Arizona	5⅞
Ely Cons. Copper	....
Furnace Creek pfd.	5½
Furnace Creek	¼
Foster	63
Giroux	5
Greene Cananea Copper	8⅞
Greene Gold-Silver	1
Hancock	6
King Edward	½
Dom. Copper	3
Keweenaw	5
Mitchell	1⅝
Nevada Utah	3¾
Nevada Cons.	9½
Nipissing	7⅝
North Butte Ext.	1⅝
Superior & Pittsburg	10⅝
Shattuck	....
Superior Copper	9
Tintic	4
Utah Apex	3½
Warren	4¾
Wolverine Arizona	3⅝
Ely Giroux	1⅛
Mont. Sho	5½
Boston Ely	1¼
Empire	1½
B. & L.	1⅛
Helvetia	2
Raven	1

Otis & Hough.

Boston

Sept. 26.—The Boston News Bureau says: On a declining metal market the position of the custom smelter is rather a precarious one and most of the producing companies that have been buying custom ores have been stopping the practice.

Many of the companies who purchased custom ores and settled for them on the basis of 25, 22 and 18 cents for the metal are in a position to sustain substantial losses, as the market has declined so fast that before this copper can be shipped East and electrolytically refined the market has "slipped from under."

The American Smelting & Refining Company is especially in position to to be affected by the declining metal prices as practically all of its copper and lead business is from custom ores, and while copper has gone down 10 cents per pound the price of lead has declined from 6 cents to 4¾ cents.

The American Smelting & Refining Company has had a growing interest in copper, especially so since the opening of its Garfield smelter. It will this year control an output of at least 100,000,000 pounds against 80,000,000 pounds last year.

Smelters common stock and Amalgamated are both paying the same rate of dividends and have been earning substantially the same, the latter more than Smelters, if anything; yet Amalgamated is selling thirty points under the price of Smelters.

The disparity in the price of these two metal stocks has done more than anything else to cause short selling of Smelters common, in many cases as a hedge against long Amalgamated.

M. M. Johnson, general manager of the Dominion Copper Company, who has just arrived in the East from the British Columbia mining region, says: "During the last fiscal year of the Dominion company, extending from July 31, 1906, to July 31, 1907, the company's smelter lost a total of 4,000 hours in operation, due to shortage of fuel, etc.

"In the first six months of the current calendar year the company was unable to do much toward increasing earnings, owing to an almost continual shut-down, which was quite the opposite to conditions in the last half of the year 1906.

"Although the company has blown in its third furnace, the entire smelting battery has not yet been able to operate under conditions that would permit of the fullest capacity being attained. The plant, when working right, should be able to treat 1,400 tons of ore a day.

"The fuel situation in the Boundary district is serious by reason of a shortage of cars. With labor there is no trouble and none is expected.

"It has even been considered to curtail production of copper in British Columbia, but if it were decided to reduce output or even close down the mines it could be done without much expense as there would be no pumping necessary. It would probably cost the Dominion not more than $1,000 a month if operations were suspended.

"The cave-in recently in the Brooklyn mine caused a delay of but three days; it was caused by a worked-out stope falling in."

Following are the quotations:

Stocks.	Bid.
Adventure	2
Arcadian	4
Allouez	28
Atlantic	9½
Bingham	8¾
Boston Con.	18
Balaklala	5½
Butte Coalition	15¾
Calumet & Hecla	640
Calumet & Arizona	110
Centennial	20
Copper Range	58
Daly-West	....
Franklin	8½
Isle Royale	15⅛
La Salle	10
Michigan	9
Mohawk	55
North Butte	47½
Old Dominion	24
Osceola	95
Parrot	12½

Quincy	81
Shannon	10½
Tamarack	65
Trinity	13½
United Copper	48
U. S. Smelting	36¾
do pfd.	37½
Utah Cons.	35⅝
Victoria	4½
Winona	....
Wyandot	85
Wolverine	120

Otis & Hough.

Nevada

San, Francisco, Cal.—Closing quotations on the Mining Exchange September 26th:

(Received over private wire of O. L. Malo & Co., 221-22 Boston Block, Denver.)

Tonopah.

Stock.	Bid.
Tonopah-Nevada	$11.50
Montana Tonopah	2.82
Tonopah Extension	1.60
MacNamara	32
Midway	80
Tonopah Belmont	2.10
Tonopah North Star	18
Ohio Tonopah	1
West End Cons.	60
Rescue	9
Golden Anchor	9
Jim Butler	73
Cash Boy	4
Home	4
Boston Tonopah	3
Monarch Pittsburg Ext.	5
Montana Milday Ext.	3
Golden Crown	5

Goldfield.

Stock.	Bid.
Sandstorm	41
Red Top	2.75
Mohawk	17.00
Columbia Mtn.	35
Jumbo	2.75
Jumbo Ext.	1.45
Vernal	15
Pennsylvania	3
Kendall	22
Booth	35
Blue Bull	30
Adams	10
Silver Pick	45
May Queen	9
Nevada Boy	5
Black Butte Ext.	6
Blue Bell	16
Dixie	5
Goldfield Columbia	30
Hibernia	7
St. Ives	60
Lone Star	19
Patlatch	30
Oro	16
Mayne	5
Atlanta	35
Great Bend	45
Simmerone	8
Empire	10
Red Top Ext	23
Florence	3.95
Diamond B. B. Cons.	21
Goldfield Daisy	1.05
Laguna	1.15
Commonwealth	23
Combination Fraction	1.75
Great Bend Ext.	12
Great Bend Annex	10
Milltown	....
Black Butte Bonanza	5
Kewanos	44
Esmeralda	9
Portland	16
Crackerjack	13
Frances Mohawk	95
Red Hills	40
Mohawk Ext.	8
Lou Dillon	8
Yellow Tiger	18
Grandma	12
Silver Pick Ext.	5
Yellow Rose	5
Goldfield Cons.	6.80

Bullfrog.

Stock.	Bid.
Original	4
Bullfrog Mining	10
National Bank	16
Amethyst	14
Gold Bar	45
Denver Bullfrog Annex	2
Bonnie Clare	35
Mayflower Cons.	32
Montgomery-Shoshone Ext.	5
Montgomery Mtn.	8
Nugget	4
Tramp Cons.	32
Victor	3
North Star	4

Manhattan.

Stock.	Bid.
Manhattan Cons.	40
Manhattan Mining Co.	5
Gold Wedge	5
Seyler Humphrey	4
Dexter	3
Crescent	2
Combination	1
Granny	20
Original Manhattan	7
Broncho	6
Jumping Jack	12
Stray Dog	9
Indian Camp	6

Other Districts.

Stock.	Bid.
Fairview Silver King	10
Fairview Eagle	1.15
Nevada Hills	4.90
Pittsburg Silver Peak	1.35
North Star Wonder	03
Eagles' Nest.	40
Ruby Wonder	10
Alice of Wonder	3
Fort Red Rosa	....

Metals

St. Louis, Sept. 26.—Lead weak, $4.52½.

Spelter strong, $5.15@5.20.

New York, Sept. 26.—Lead easy, $4.60@4.75.

Lake copper dull, $15.00@15.25.

Silver, 67⅜c.

USE OF COPPER.

It is an interesting coincidence that the three large electrical companies of the United States, the General Electric, Western Electric and the Westinghouse Electric, each consume a pound of copper in producing a dollar's worth of gross business. In other words, the three companies require as many million pounds of copper annually as they produce in millions of dollars of gross business. This statement may be better illustrated by the following comparison, showing the gross receipts and copper consumption of each of the three companies during their last fiscal year:

	Gross Receipts.
General Electric	$ 60,071,883
Western Electric	69,245,331
Westinghouse	29,189,844
Total	$158,507,058

	Pounds Copper Used.
General Electric	60,000,000
Western Electric	70,000,000
Westinghouse	32,000,000
Total	162,000,000

Neither the Westinghouse Electric nor the Western Electric draws any of its own copper wire. The General Electric Company has a rolling mill and buys considerable ingot copper.

Charles F. Brooker of the American Brass Company is understood to be the real buyer of the greater portion of the copper used by the three electrical companies—in fact, the Western Electric Company is the largest consumer of the American Brass Company. His relations with the General Electric are largely advisory, as much of the actual buying of General Electric Company copper is done by President Coffin himself.

It is interesting to figure that the recent decline in copper of 10 cents per pound, as based on current consumption of the three companies, means an annual saving of about $17,000,000.

MACHINERY AND EQUIPMENT

Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.

SINCLAIR DRILLS AND SHARPENING MACHINES.

In the cuts presented herewith are shown the very latest and most improved type of air hammer rock drills and sharpening machines, manufactured and sold by Fairbanks, Morse & Co., at their numerous branch houses. The drills are now too well known to the general mining public to require a detailed description, but an outline of what the manufacturers claim for them might prove of interest to mine operators of the West.

Sinclair Drill, With Locking Device.

The drill shown mounted on a drift column is built in two sizes, No. 1 and No. 2. Both machines are constructed on the same lines, the only essential difference being in the size of the cylinders and feed piston. The No. 1 machine weighs thirty-five pounds and is built for all-around light work in a mine, several hundred of them being in use in shaft, drift, stope and raise work. The No. 2 machine weighs fifty pounds and was designed especially for tunnel, stope and raise work in hard ground. Both machines are fitted with the Sinclair Locking Device, which enables the operator to use them as well for down holes as for uppers.

Only the best of material is used in the construction of these drills, and with few working parts and large bearing surfaces, will last longer under severe service than any machine on the market.

One customer reports that he had, in forty-eight working shifts, driven 160 feet in an 8x8-foot crosscut tunnel, where hand work was abandoned on account of the extreme hardness of the ground, which, prior to the installation of the Sinclair drills and sharpener, had cost from $20 to $25 per foot. This expense has been reduced to less than $8 per foot with the Sinclair equipment.

The No. 2 Hand Drill shown is designed especially for down holes in shafts or winzes and embodies the same general construction shown in

Sinclair Hand Drill.

all Sinclair machines. Simplicity of construction, large bearing surfaces and first-class workmanship, coupled with the best of material, go to make up a superior machine for down hole work.

The Sinclair sharpener shown was originally designed for sharpening hexagon bits for use with hammer drills, but the manufacturers report so many inquiries for cross-bit sharpeners for handling cruciform steel for 2¼-inch drills that they are now building machines to meet these requirements. The machine shown in the cut herewith has a capacity only limited by the heating facilities, and for general mine work easily takes the place of from five to seven men. The bits formed in the machine are absolutely uniform in shape and will cut at least 25 per cent. more ground than hand sharpened steel.

With the machines are also furnished, when desired, an attachment for bulldozing shanks. By the use of this simple arrangement, it is possible to form a first-class shank on a piece of steel, in one heat. This does away with the only objection ever offered to shanked steel. Mine operators realize that where the hammer strikes directly on the steel instead of on an intervening striking pin, which in turn strikes the steel, the drilling capacity of the machine is greatly increased. Practical tests show a difference of from one to two inches per minute in free cutting granite.

Sinclair Drill Sharpener.

A new catalogue of these machines is in the hands of the printers and copies will be furnished on application by Fairbanks, Morse & Co.

GREENE-CANANEA.

Boston—The United Metals Selling Co. is still selling the output of the Greene Consolidated Copper Company, although the American Metal Company holds the contract for the refining and selling of the copper.

The latter company has made demands upon the United Metals Selling Company for the disposition of the copper according to contract, but as the Amalgamated-Cole-Ryan interests now control the Green Company they have ignored the American Metal Company's claims. While lawsuits are threatened, no legal action is yet known to have taken place.

Less than five per cent of the stock of the Greene Consolidated and Cananea-Central is now outstanding in the hands of the public, about ninety-five per cent. of each having been turned in for the exchange into securities of the Greene-Cananea Company.

PERSONALS

Fred Strout, superintendent of the Golden Crest Mining Company, Deadwood, has been in the East for several weeks in the interest of his company.

Percy Rolfe will shortly assume the duties of general manager of the Keystone mine in Wyoming.

Stanley V. Graham, superintendent of the property of Mina El Favor, Ltd., Jalisco, Mexico, recently visited various sections in Canada.

John Jacka has been appointed chief mining engineer of the Ojibway Mining Company, operating copper properties in Keweenah county, Michigan.

Lafayette Hanchett, general manager of the Boston Consolidated Company, of Bingham, Utah, recently inspected mining properties in Gilpin county, Colorado.

Frank Buckley of Denver, president of the Crested Butte Coal Company, has the credit of settling the strike recently declared at the mine. Frank is a settler from away back.

H. Mortimer-Lamb, secretary of the Canadian Mining Institute, is on a visit of inspection to the mining districts of Alberta and British Columbia.

Daniel G. Kidder, M. E., Spokane, Washington, was in Chicago last week after making an examination of properties in the Seven Devils district, Idaho.

Baron K. Nakashima, T. Furuakawa, M. Otagawa and T. Hasegawa, identified with the Furukawa Mining Company, in Japan, were recent visitors to the Lake Superior copper region, where they inspected the workings of various properties.

Dr. U. S. Grant, professor of geology at Northwestern University, Evanston, Illinois, will serve as acting dean of the College of Liberal Arts of that institution during the absence of Dean T. F. Holgate, who will spend a year in Europe.

Professor L. W. Trumbull, of the mineral department of the university of Wyoming, has been in California recently experting a mine owned by Eastern parties. The property is an old one, but it has been badly managed, and the owners wanted a reliable expert to determine what course to pursue with it in the future, so they sent out Professor Trumbull to report on it.

A. C. Bird, vice president of all the Gould lines, has resigned as the result of long continued ill health. Mr. Bird had been carried on the pay roll for two years at $20,000 a year without being able to do any work. He rose in twenty-five years from office boy to one of the highest railroad positions in the United States with a salary of $75,000 a year.

Thomas F. Walsh and his expert, John W. Benson, were up in Wyoming last week examining the Swartz property, adjoining the Silver Crown, not far from Granite Canon. A hasty examination of the grounds, development and improvements was made, but they were close-mouthed and returned to Denver wiser, if not better, men. It is not supposed they went up there for their health altogether, but like successful business men, they kept that part of it to themselves.

THE RIO GRANDE'S SPLENDID SHOWING.

For the fiscal year just past the Denver & Rio Grande Railway Company, through President E. T. Jeffery, makes the following highly creditable report. We are all proud of the Denver & Rio Grande. It is a Colorado enterprise and has been a great power in the development of her resources. The annual report is being sent out by J. B. Andrews, assistant to the vice president, and it simply represents the growth and enterprise of the great system. In his review President Jeffery says:

The company applied a portion of the current income to improvements and extensions, because the money stringency did not permit of the sale of bonds at a fair price. The company spent $700,000 of the current income for additional trackage and large sums for additional equipment.

Under the terms of the equipment trust, explained in former annual reports, two semi-annual payments of principal and interest were made, amounting to $195,562,50, of which $138,500 was paid out of the special renewal fund and the balance, $57,062.50, was paid out of the general fund and charged to profit and loss.

The two extensions or branches in the Bingham district, Utah, referred to in the last annual report, were completed and are now in operation. Additional expenditures in connection with them have been authorized by the management because the tonnage of low grade ores to be moved from the mines to the smelters has increased rapidly, making necessary not only additional trackage facilities, but also facilities for housing and taking proper care of the moving power assigned to this traffic. About $245,000 par value Rio Grande Western four per cent. consolidated mortgage bonds were issued during the year on acount of these branches or extensions, thus completing the issue authorized by the mortgage on this twenty-eight miles of railroad.

There were purchased during the year fifty-one locomotives, nine passenger cars, five chair cars, four dining cars and 250 ore cars, all standard guage, at a total cost of $1,256,915.54, of which the sum of $1,029,209.55 was provided from income. Additional freight equipment to meet the demands of growing coal and ore traffic was authorized and an appropriation of $825,000 was made from the income of the last fiscal year to cover, in part, the cost thereof. A further appropriation of $700,000 was made from income to provide additions and improvements to the fixed plant, especially additional trackage facilities that were greatly needed in various localities on both Denver & Rio Grande and Rio Grande Western. Further expenditures for similar purposes must be made without delay, in view of the congestion of traffic at times on several portions of the standard guage system.

Your directors have deemed it prudent and proper to aply, so far as practicable, a portion of current income to these uses, for two reasons:

First, because monetary conditions have not permitted the sale of securities, except at great sacrifice, and, second, the quotas of bonds authorized by the mortgages for additions and improvements are not far from complete issue, and your directors thought best to hold in reserve the balance of the quotas for future use and when they may be sold at fair prices. The unissued bonds available for this purpose are about $2,100,000 Denver & Rio Grande first mortgage four per cent. bonds and about $1,000,000 Rio Grande Western first consolidated mortgage four per cent bonds.

In this connection it is desired to present for your careful consideration the following statement, comparing the salient financial and physical features of the property for the years 1907 and 1896. The reason for selecting 1896 for comparison is because dividends were then resumed on the preferred shares, at the rate, however, of only two cents per annum, after the trying years of 1893, 1894 and 1895.

The following is a detailed statement to the stockholders:

The income of your company for the fiscal year ended June 30, 1907, including $243,379.17 interest and dividends received, was $21,652,420.89, an increase of $1,704,181.25 as compared with the previous year.

The gross earnings from operation were $21,409,041.72, being an increase of $1,722,926.93 over the previous year; the operation expenses were $13,252,112.26, being an increase of $1,147,-

940.10, and the net earnings were $8,156,929.46, an increase of $574,986.83. The percentage of increase in gross earnings was 8.75 per cent., in expenses 9.48 per cent., and in net earnings 7.58 per cent.

After providing for all charges against income, including two semi-annual dividends of 2½ per cent. each, upon the preferred capital stock, and contributing $120,000.00 to the renewal fund, there remained a surplus from the year's operations of		$1,769,944.17
From which appropriations were made for:		
Additional standard gauge equipment	$825,000.00	
Additions and improvements to the fixed plant	700,000.00	1,525,000.00
Leaving surplus carried to profit and loss		$ 244,944.17

There are bonds and stocks in the treasury of the company at par value amounting to $81,744,507.50, which are carried on the books at $26,197,970.13; also bonds at par, and cash in the special renewal fund amounting to $433,812.54, carried at $334,026.29, and bonds and stocks deposited with the Morton Trust Company as collateral for certain first consolidated first mortgage bonds of the Rio Grande Western Railway Company amounting at par value to $16,614,000 and carried at $9,768,063.52. A statement in detail covering these securities will be found on page twenty-three of this report.

There was no unpaid vouchers at the close of the fiscal year, except those for June which are payable in the ordinary course of business during July.

The independent examination of the accounts of the company, required by the by-laws, was made by E. B. Pryor, vice president of the Wabash railroad, his selection being decided upon by the committee appointed at the last annual meeting of the stockholders. His certificate will be found on page nine of this report.

The capital stock of the Rio Grande Western Railway Company, $17,500,000, was acquired by the issue of $20,750,000 Denver & Rio Grande preferred stock in 1901, prior to which the Rio Grande Western had acquired the capital stock of Utah Fuel Company in exchange for $6,000,000 Rio Grande Western first consolidated mortgage bonds.

Improvements and additions from capital during the eleven years, including the capital stock of R. G. W. Ry., and securities of other auxiliary companies	$40,946,399
Improvements and additions from profit and loss and income	12,155,188

Denver & Rio Grande and Rio Grande Western	1907.	1896.	Percentage of Increase.
Total mileage, main line and branches	2,552.38	2,177.46	17.22
Mileage, second main track	73.43	33.21	121.11
Mileage, standard gauge lines	1,757.38	1,181.85	48.70
Mileage narrow gauge line	795.00	995.61	Dec. 20.15
Mileage, yards and side tracks	559.03	412.10	35.65
Aggregate weight of rails, in net tons	295,511.	216,423.	36.54
Number of locomotives	533.	366.	45.63
Total locomotive tractive power	14,162,971.	6,754,099.	109.69
Number of passenger train cars	367.	276.	32.97
No. of freight cars, all classes except cabooses	13,908.	8,065.	73.45
Total tonnage capacity of freights cars	425,765.	166,712.	155.39
Gross earning	$21,409,041.72	$10,008,544.90	113.91
Net earnings	8,156,929.46	4,160,367.84	96.06
Interest, taxes, rentals, etc	4,100,132.79	3,083,970.09	32.95

Comment on the statement is really unnecessary, but your directors cannot forbear emphasizing the fact that more than $12,000,000 was expended on the property, nearly all from income, and without incurring any additional fixed charges.

In eleven years the gross earnings increased about 114 per cent, and net earnings nearly 100 per cent.; the fixed charges about 33 per cent.; narrow gauge mileage was reduced 200 miles by standard gauging; the standard gauge lines were increased about 575 miles, and the mileage of the system, main line and branches, increased about 375 miles.

During the fiscal year about 8,850 tons of new eighty-five-pound steel rails were used, of which about 7,640 tons were laid on the main line of the Rio Grande Western, making a total of 627 miles of road laid with that weight of rail between Denver and Ogden. The remainder of the new eighty-five-pound rail was used for replacing worn rails and for providing additional trackage facilities; other portions of the main line between the points hereinabove named where seventy-five-pound rails are in use will be relaid with eighty-five-pound rails as occasion requires, and the released second-hand rails will be used on lighter traffic portions of the system.

The belief your directors expressed in the last annual report, that there would be greater business activity, accompanied by substantial increase in traffic and revenues, was realized, although the net results were less than anticipated owing to advanced prices of labor and materials. As hereinabove stated, the gross earnings from operations increased $1,722,926.93, of which $1,279,609.15 was from freight, $344,730.48 passengers and $98,587.30 express, mail and miscellaneous. The average gross earnings per mile for the entire system were $8.564, or nearly $4,000 per mile more than for the fiscal year ended June 30, 1896, and the net earnings per mile were $3,263, or about $1,350 per mile more than they were eleven years ago.

The year that has just closed was marked by conditions of general prosperity in the two states traversed by your system, due, in a great measure, to the lawful and peaceful endeavors of all classes of labor, at good wages, to promote general industry and commerce and the general welfare of the states of Colorado and Utah. If these desirable conditions continue, and the prices of base metals are fairly well maintained, there is every reason to believe that the new fiscal year will yield results at least equally as good as those covered by this report.

Former reports have explained at length and fully the relations with the Western Pacific Railway Company and the carefully matured plans for constructing a low grade line between Salt Lake City and San Francisco. Work has been delayed by the general scarcity of labor throughout the country, accentuated, so far as Western Pacific was concerned, by the demand for labor in San Francisco, following the calamity which befell that city.

At the close of the fiscal year there were 177 miles of track laid and grading was proceeding more actively than it had been during the preceding ten or twelve months. The most retarding feature just now is the slow progress at certain important tunnels, on the completion of which must depend the opening of the through main line. The chief engineer of the Western Pacific company has been especially directed to expedite this branch of the work and the contractors have been pressed as strongly as possible to make more satisfactory progress. It is hoped and believed that the Western Pacific Railway Company will have a continuous line of rails from Salt Lake City to Oakland by September 1, 1808, or very soon thereafter.

By order of the board of directors.

E. T. JEFFERY, President.

Denver & Rio Grande R. R. Co. Capitol Stock D. & R. G. R. R. Co.	1907.	1896.	Increase
Preferred	$ 45,761,400	$ 23,650,000	$22,111,400
Common	38,000,000	38,000,000	
Total Capital Stock	83,761,400	61,650,000	22,111,400
Funded debt D. & R. G. R. R. Co.	49,134,500	43,136,000	5,998,500
Funded debt R. G. W. Ry. Co.	29,682,400	16,000,000	13,682,400
Total Funded Debt	78,816,900	59,136,000	19,680,900
	$162,578,300	$120,786,000	$41,792,300

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(Continued on Page 31.)

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On September 23rd-24th and 25th the Iron and Steel Institute will be held in the House of the Austrian Engineers and Architects' Society in Vienna, its annual meeting. The following papers have been named to be read. The Development of the Iron Industry of Austria since 1882, by W. Kestranek; On the Styrian Erzberg Iron Ore Mines, by H. Bauerman; On Steel and Meteoric Iron, by F. Berwerth; On the Determination of the Quality of Blast Furnace Gas for a Given Make of Pig Iron, by Josef von Ehrenwerth; On the Application of the Laws of Physical Chemistry to the Metallurgy of Iron, by H. von Juptner; On Case Hardening of Mild Steel, by C. O. Bannister and J. W. Lambert; On a New Blue-Black Paint as a Protective Covering for iron, by R. J. R. Carulla; On the Hardening of Steel, by L. Demozay; On the Structure of Hardened Steel, by Percy Longmuir; On Case Hardening, by G. Shaw Scott; On the Ageing of Mild Steel, by C. E. Stromeyer; On the Economical Distribution of Electric Power from Blast Furnaces, by B. H. Thwaite. Bennet H. Brough is secretay of the institute.

ALLIS-CHALMERS CO.

After a series of conferences of directors and officers of the Allis-Chalmers company Thursday afternoon, E. H. Gary, chairman of the board, gave out the following statement:

"My connection with the Allis-Chalmers company has been nominal and there is no intention to make it active. On the contrary, I have many times expressed a desire to be relieved from membership in the board. My services belong, and are entirely devoted to the United States Steel Corporation. Still I think from the reports of the officers of the Allis company, and from information otherwise received, that it should be very successful if it had a little more working capital and its management somewhat strengthened. I believe efforts are being made in this direction. There is no connection between the company and the United States Steel Corporation."

This statement was in many quarters accepted as a confirmation of the substantial truth of the previous dispatches from Milwaukee, to the effect that a movement was on foot to bring W. V. Kelly, president of the American Steel Foundries, into the management of the company in some active capacity, and that the Allis-Chalmers company was about to be provided with a large amount of additional working capital by some of its influential directors. One version of the story that the United States Steel Corporation would advance the money, but this was doubted in well informed quarters.

It is understood that no change in the organization of the Allis-Chalmers company has as yet been definitely made. Judge Gary's statement, however, was accepted as an indication —that changes in or addition to the roster of officers are contemplated. Mr. Kelly attended some of the conferences of the Allis-Chalmers people.

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BUYERS' GUIDE

(Continued from Page 29.)

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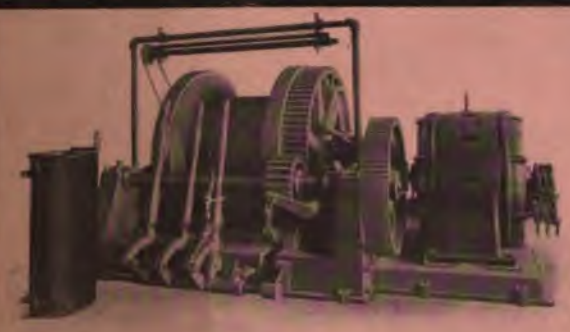

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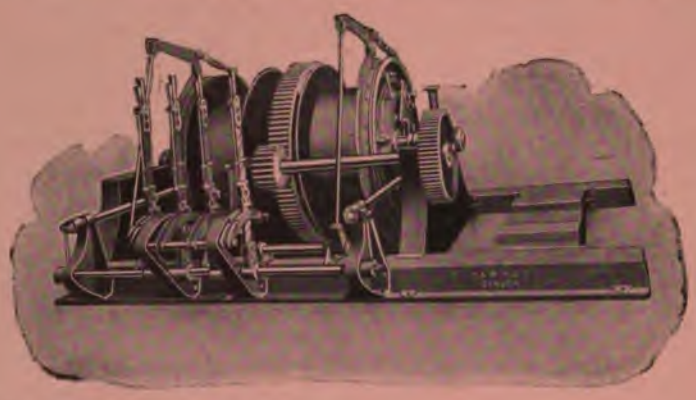

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Publishers Will Not Stand the Raise

Members of the American Newspaper Publishers Association met recently at the Waldorf-Astoria, New York, and appointed a committee to call the attention of President Roosevelt to what they believe is an unlawful combination of the paper manufacturers to control prices at an unreasonable figure. They claim that print paper is altogether too high, and that will apply to about all varieties that are turned out by this gigantic trust. The press all over the United States is taking up the matter, and it is hoped some relief may be brought about through the influence of the President.

Herman Rider, president of the Publishers' Association and publisher of the New York Staats-Zeitung, said:

"In striking at the tariff we are doing the newspaper industry a kindness. We are making it safe for them to extend their business into Canada without fear of a tariff war which would otherwise make such an investment unsafe."

A number of other prominent publishers spoke in a similiar manner.

The paper manufacturers claim they are making no money, as its costs them more to produce a good article of paper than it did a few years ago. An effort will be made the next session of Congress to remove the tariff on paper, thus permitting it to come into the United States from Canada, Nova Scotia, New Brunswick and other British territory duty free. That will effectually bring the paper trust to terms or drive it out of business.

A Great Day in Mexico

On the Sixteenth of September, Mexico celebrated the ninety-seventh anniversary of her declaration of independence. It was similar to our Fourth of July demonstrations. Americans, Europeans and other foreigners took part in the exercises.

Saturday, the fourteenth, the Republic celebrated the seventy-seventh birthday of President Diaz. These anniversaries come very near touching each other. Monday evening the President delivered his message of 10,000 words to the Mexican Congress. He is a vigorous man physically and mentally and the most able ruler Mexico ever had. He has placed his country on the broad basis of substantial growth and prosperity. President Diaz has encouraged education, public spirit, enterprise and immigration, and under his leadership Mexico has made marvelous progress in the past two decades. Her incomparable resources are undergoing extraordinary development and capital is going into the Republic at the rate of $50,000,000 a year. Her mining, agriculture, manufacuring, railroad building and other industrial interests have made great progress during the last ten years, and capital is searching every part of the Republic for investments.

In his message President Diaz says the federal revenue for the fiscal year 1905-06 amounting to $102,000,000 was the largest in the history of the country up to that time, but was exceeded by the fiscal year 1906-7 by $11,000,000.

The excess of revenue over expenditures during the year which terminated on June 30th, last, was at least $20,000,000 although it cannot be stated with complete accuracy, as some accounts remain to be settled. The import duties for the year totaled $52,000,000 double what they were only five years ago.

President Diaz declared it as his belief that peace was now assured and that the joint action of Mexico and the United States in intervening in the affairs of the five republics to the south had undoubtedly prevented a disastrous war.

He paid the United States a fine compliment and advised his people to look to the great republic on the north for their knowledge in the art of mining, manufacturing, agriculture, irrigation, and other industries. He said more capital and enterprise were coming into Mexico from the United States than from all other countries combined.

Cause of the Depression of Copper

E. A. Norton of Denver states that the present depression in the price of copper is caused by the concerted action of the European consumers, and that the price will soon find its level at 20 to 22 cents.

Mr. Norton is interested with English, New York and Virginia capitalists in the ownership of the Penn-

Wyoming Copper Company, operating large properties at Encampment, near the Wyoming-Colorado line in the North Park country.

"The average price of copper for twenty-five years was 14¾ cents," said Mr. Norton, "but it will not be that low again for any length of time. The demand is so great that the present quotation of 15 to 17 cents can not long prevail. I have recently visited the largest consumers in Europe, and am satisfied from the information I gained there that copper will shortly settle down to from 20 to 22 cents and remain at that standard price."

Mr. Norton is entertaining the owners of the copper properties in which he is interested. The same capitalists own 91,000 acres of land in Carbon county, Wyoming, and are now engaged in placing it under irrigation.

In order to bring their Encampment properties within reach of the market, the company is constructing a railroad from there to Walcott to connect with the Union Pacific, a distance of forty-five miles. Thirty-five miles of this new road is already completed and the rails are on the ground for the remaining stretch. When this spur is completed it will open a new coal field that will be within easy reach of Denver, the Hahn's Peak country, in which Encampment is located, being exceptionally rich in coal as well as copper.

"It will place a new coal field at Denver's door and I hope will assist in settling the present prices of coal," said Mr. Norton. "We are in the copper mining business, but the opening of the road to give us a direct shipment for our ore will serve to also place the new coal on the market."

The Penn-Wyoming Copper Company has expended $5,600,000 in its properties at and near Encampment, and operates its own smelting and reduction works there, shipping upwards of a million pounds of the refined metal a month. They send this to the railway overland, using 360 horses and mules to haul out the copper and bring in the coke and other supplies. The completion of the new railroad will do away with this expense.

It is promised by Mr. Norton that the entire North Platte valley will be benefited by reason of the company's investments in both land and mining properties in that district. Engineers have just completed three surveys for an irrigating canal that will place not less than 600,000 acres of Wyoming and Colorado land under irrigation. A dam is also to be constructed that will furnish power and lights for Encampment, Pearl, Rawlins, Saratoga and other towns in that territory. This dam will be placed across the North Platte in one of the canons near the Colorado-Wyoming state line.

The party includes some of the best known of the English investors of American properties and represents an aggregate capital that is practically unlimited. Several noted engineers are also interested in the big land deal. Among these is Frank Kramer, who is well known in engineering circles throughout the West. Charles Hansel is another of the engineers. G. Antoine and F. H. Bromwich are two of the European members of the party.

"I have never seen men quite so much interested in anything as these foreign and eastern capitalists are in Colorado and Wyoming," said Mr. Norton. "They are not only willing to invest their money here, but they have already invested several millions of dollars, showing their faith by their works, as it were. The opening of the country in the North Park district will materially help in building up the entire western country, and the completion of our new railroad ought to result in giving Denver a better chance to demand cheaper coal, because the fields we tap are as rich as any that are now open in this country."

Carnotite in Colorado

The first heard of Carnotite was in 1899. It is an ocherous pigment of a canary-yellow and is found impregnating a silicious sandstone in Colorado, Montana and Utah. This mineral is a source of the rare elements uranium and vanadium, and tests have also shown that it contains the still rarer element, radium. Uranium and vanadium have attracted much attention in recent years, uranium being used as a pigment in photography, and vanadium being added to steel to increase its tensile strength, elasticity, and ductility. Uranium also has the property of increasing the hardness and elasticity of steel and of aluminum, but has not yet been much used for this purpose. Carnotite has been discovered at a number of places in Colorado and adjacent parts of Utah. Particularly interesting deposits are found near the valley of Coal creek, about fourteen miles northeast of Meeker, in Rio Blanco county, in the northwestern part of Colorado.

It has also been found near Gladstone, San Juan county, and in other parts of the San Juan triangle. However, it has not been mined there yet, as a commercial product, but more attention may be paid to it in the near future. These mountains are rich in the rare minerals, and when mining men get enough of the minerals that are not so rare, they may turn their attention to carnotite, uranium, vanadium, radium and their kindred elements.

A Jade Mine in California

It is said the only jade mine in the United States is in the Klamath National forest, Siskiyou county, California, where it was found only about one year ago. Samples of the jade were sent to Germany to be tested, and were pronounced to be of standard grade and capable of taking a high polish. Preparations are being made to develop the mine and ship the rock to Germany to be worked into ornaments. A permit for building a road to the mine has been secured from the forest service, which is especially charged with furthering in all possible ways the development of mines and all other Natianal Forest resources.

Jade is sometimes called "kidney-stone." It is a massive, or crypto crystalline silicate of magnesia, allied to hornblende, with specific gravity from 2.96 to 3.18, and hardness from 5.5 to 6.5.

Damour divides it into Oriental jade with a specific gravity of 2.96 to 3.06; colors white and variously tinted. Oceanic jade has a specific gravity of 3.18, and has a silky luster due to the exceedingly delicate fibers. It is found in places in Central Asia, China, New Zealand and now in the United States. It takes on a very high polish, and is used for ornamental and other purposes, more especially by the Oriental nations. Jade has been found in the ruins of Troy and other ancient cities. It was made into implements and quite extensively used in prehistoric times. In all probability the stone will yet be found in large quantities in this country and become of commercial importance.

NOVEL WAY TO REMOVE WATER FROM A SHAFT.

A man known as "Gassy" Thompson once took a job to remove the water from a certain mine in Colorado for $180. He went to his partner with the proposition and was called a fool. "Waal," said "Gassy," "I'll go it alone."

That night he caught a dog, took it to the mine, cut its throat and strewed the beast's blood promiscuously about the place, and about the top of the shaft. He then threw the dead dog down and climbed up the hill and hid behind a tree. About an hour later a miner came along and saw the blood. He immediately ran to the nearest camp and reported that murder had been committed. In short order a large number of men appeared and the mine was cleared of water and the murdered dog discovered.

The next morning "Gassy" reported that the mine was clear of water. The owner examined it and paid him his $180. "Tricks in all business 'cept mine," he remarked as he pocketed his coin.

The Story of Pioche*

(Continued from last week.)
By James W. Abbot.*

The stamps weighed 750 pounds each. There was a boiler twelve feet long and thirty-eight inches in diameter, capable of developing twenty-horse power. There were five vats, four pans and two settlers. The mill building proper was of wood, twenty-four feet square. The boiler and pan room was thirty by forty feet. A very modest layout indeed, but it was there for business and its record as a wealth producer has perhaps never elsewhere been equalled. The ore was fed into the mortar by hand and crushed wet, ten tons of it every day. The pulp (the finely crushed material) was caught in the vats. From these it was shoveled into the pans, and a definite amount of quicksilver added, and a pan nearly full of ore had sufficient water poured in to fill it. A grinding and agitating contrivance, known as a muller, was hung from a stem in the center. The stem was made to revolve by a system of belts and gears actuated by the engine. As it revolved the muller ground up the ore and mixed it intimately with the quicksilver after the method of a mortar and pestle. Now quicksilver has a certain affinity for gold and silver which nobody understands, although many learned treatises have been written to expound the various phases of man's ignorance regarding it. A man named Fletcher has incorporated his name into the English language by telling how if food is chewed to infinitessimal fragments there results an intimate admixture with the saliva and perfect digestion ensues. Now if you "fletcherize" gold and silver and quicksilver you get an intimate admixture from which the assayer knows how to recover gold and silver bullion. After you "fletcherize" in the pans their entire contents are emptied into settlers, a large proportion of water added and the whole thing stirred up patiently until the gold, silver and quicksilver mixture, which is several times as heavy as the waste rock, collects at the bottom. The waste material, called "tailings" is scooped out and thrown into a pit and the combined quicksilver, gold and silver is ready for the assayer.

Such briefly and crudely was the principle resorted to for the Pioche ores when it was found that under the existing conditions smelting was unsatisfactory. Of course in the future all Pioche ores will be smelted. Somewhere down in this region one of the great smelting plants of the world will derive its ores from Pioche and the surrounding mines. This I will try to refer to briefly later. But smelting at that time proved wholly impracticable.

The stamps of the little "Pioneer Five Stamp Mill" commenced dropping in February, 1870. Every day ten tons of ore was ground up. It averaged in value $240 a ton. Of this amount $120 stayed in the tailings, $30 was absorbed by the cost of the process and $90 was velvet. But $900 a day counts up. During the first month the Mormons at Panaca were paid every dollar that was coming to them, and to this was added every day, Sundays included, $50 coin of the realm for ore hauled down from the Burke mine. Life in that remote corner of Brigham Young's domain began to take a very new and pleasing aspect.

Meanwhile history had been making with Meadow Valley Company. Hoffman had discovered that some other process than smelting must be adopted to recover their values. To bring in coke from England for fuel at a cost which made it a precious metal when it arrived and to ship out lead, silver bullion at a cost several times as great as the lead would bring, was far from exhilarating. In the latter part of 1869 a toll road was opened through the most difficult part of the route from White Pine to Pioche and soon after this event the Meadow Valley Mining Company shipped by wagon ninety-five tons of ore to Smoky Mill at White Pine for treatment. This was also a Washoe Process mill, so-called because the process above described was first devised to treat the ores of the Washoe district, Utah, later known as the Comstock Bonanzas of Virginia City. I am told by a man whose memory of the occurrences of those days is still vivid, and whom I believe to be entirely truthful, that those ninety-five tons assayed $700 a ton and that some of it contained so much native silver that one could stamp an image of the Goddess of Liberty on it with a fifty cent piece.

Naturally such ore yielded to treatment and plans were at once made for an elaborate mill for the Meadow Valley company. This company, headed by the affluent Pioche, and officered by men of ability, was not compelled to appeal to any rural Mormons with a tale of poverty and woe. They could design and equip as seemed best. So they selected a site in Dry Valley, ten miles northeast of Pioche, where a well had been sunk to abundant water and where a sloping hillside lent itself admirably to plans for economic ore handling. Here they built a stone foundation 100x106 feet in size and upon it erected a splendid twenty-stamp mill. There were two boilers, each sixteen feet long and fifty-six inches in diameter, and two smokestacks sixty feet high and forty inches in diameter. There were forty vats for the pulp, ten pans and five settlers. Each pan would hold 2,600 pounds of pulp. There was an up-to-date engine of 120-horse power. As an auxiliary value-saving device there were installed two Hungerford Concentrators, a mechanical invention unknown to twentieth century practice. Before a wheel was turned the plant had cost $100,000. Its stamps began dropping July 15, 1870.

But the race is not always to the swift nor the battle to the strong. The fortunes of the erstwhile impecunious Ely and Raymond flourished apace. The little dinky five-stamp mill kept pouring forth a golden stream. John Ely was by nature a voluptuary. He married one of Panaca's fairest daughters and built him a home right where the music of the stamps from the "Pioneer" could lull him to slumber with their grateful monotone.

The Mormons had given their word to the men who brought the goddess of Plenty to their peaceful valley that the use of necessary water for ore reduction should be theirs alone and that no rival interests should get foothold without their concurrence. The little cluster of buildings which sprang up around the "Pioneer" was named "Ely City."

As the stream of bullion which started from "The Pioneer" grew to a mighty flood and a hundred stamps with their din made thunderous roar in Ely City the people forgot the man, while their minds dwelt on the thing which was a world's wonder and they began to call the place "Bullionville." The skeletons of these old mills now lie scattered and rusting. The man under whose guidance there will arise a new mill city where they stood is a potent force in the mining world. He has the power if he will to bring back permanently to the lips of men the name of the man whose home there in the early day was the scene of the most glorious hospitality which ever ameliorated the asperities of a frontier.

Old Mining Laws.

The law under which mining locations are made and title obtained for mineral lands belonging to the United States was not enacted until 1872. Years before this every foot of ground within several miles of Pioche suspected of containing mineral was claimed under the law of 1866. This law permitted the discoverer of a vein

*In Arrowhead Magazine.

or lode to claim 200 feet along the vein by reason of his general privilege as an American citizen and 200 feet more by reason of the fact that he was the discoverer. What a locator's right was to anything on eitherr side of his vein where it came to the surface was a question upon which the information available was most vague and unsatisfactory. Because of this condition there were innumerable disputes. The ore in the vicinity of Pioche occurred in veins of which the general course was easterly and westerly. The country rock belonged to an early geologic period known as the Cambrian and was principally quartzite, very hard and firm. The most noted of the deposits were as characteristic true fissure veins as can be found anywhere in the world. There are places in the old workings of the Raymond and Ely and Meadow Valley properties, which are said to show stopes thirty feet wide and other places where the vein was so uniform that when stoped out an open space was left in which daylight could be seen from a level 700 feet below the surface. The system of veins both below and above ground was very complex and the number of separate locations made within a limited territory was a condition which could not occur under the law as it is now. If it wasn't clear from surface evidence that a vein which outcropped was an integral part of some vein already claimed, it was liable to be treated by the finder as a new discovery and claimed, although it might be only a few feet in any direction from one notoriously owned and worked. In addition to the vagueness of the law, impatience of any legal restraint was the order of the day. Nevada was then the Mecca of the adventurer, and the outlaw. New and rich mining camps always are. Nevada had an enormous territory and few people. When the principal discoveries were made the region was, or was supposed to be, a part of the territory of Utah. Then Congress changed the boundaries and put it into Nevada, but until the boundaries were run people claimed allegiance according to their preference. Lincoln county, Nevada, was established by statute February 26, 1866, and the county seat located at Hiko, where all the officers, including the sheriff, resided. The boundaries of Lincoln county were changed after that and it was not until about January 1, 1871, that an official boundary survey settled all controversies regarding the territory which the county included. In March of that year the county records were brought from Hiko to Pioche to remain there temporarily for three months until an election could be held determining its permanent locus. This election was held the first week in May of that year and Pioche carried it, receiving 515 votes to 122 cast for Panaca.

Even after that there was for years little restraint and protection by law. Grafters lived then as now and plied their trade as shamelessly. The sheriff was far more interested in acquiring illegal fees for his own pocket than in protecting the innocent and peacefully inclined citizen. The county commissioners reached their own fingers deep into the public treasury and were not disposed to hold other county officers to rigid accountability.

Under such conditions the man who couldn't protect his location and claim "vi et armis" was likely to have to yield to somebody who could. War between opposing factions was the order of the day. The ruling price for gun fighters was $20 a day and there were no scabs to agitate for a cut. Desperadoes came in in droves and were often hired the day they reached the town. Cases of Henry rifles and ammunition came in weekly, consigned to the headquarters of opposing forces. Stone houses, large enough to make living quarters for a dozen or more men, were erected and used as forts. A blaze of musketry on the hill was notice to the people in town that a pitched battle was raging. Sometimes the hostilities transpired underground, and when some new connection was made in the workings, opportunity was afforded to shoot or blow up the enemy.

Pioche Starts a Cemetery.

The cemetery became in a sense an institution of local pride and for a time each new comer was told in boastful language the number buried there who had not died with their boots on. "Pioche in '72" has been celebrated in song and story for its men who were handy with the trigger.

"He had sand in his craw,
But was slow on the draw;
So they buried him out in the dew
In Pioche in '72."

is the sanguinary narrative told in one of these verses.

The tale of the passing of Casey is typical of the custom of the country in those days.

Mike Casey and Pat Gossan were partners. They were Irish, as their names imply, and quick to resent an affront of any kind. They had sold a claim on the summit of the hill to the Meadow Valley Mining Company for $100,000, and had received the money in checks on San Francisco. Together they went to the bank of Barnum Field to settle a personal difference between them of about $300. Field was the local manager of the Pioche branch of the Bank of California, which at that time was the great rival bank in Pioche to the Bank of Wells Fargo and Company. They had no difficulty in agreeing as to the balance due, but, they got into a wrangle as to how it should be paid. The debtor wished to settle with a check on San Francisco. There was then a discount on all San Francisco exchange of five per cent. The creditor refused this character of liquidation and offensive language was used by both sides. Each instantly drew a derringer and began emptying it in the general direction of the other and of any citizens who might be innocently within range. A ball passed through the abdomen of Gossan and came out near his spine. He lived until four the next morning.

At the coroner's inquest, which in such cases was always held as a matter of form (and fees,) one James Levy testified. Meeting Levy a few days later Casey proceeded to advise him of the opinion he entertained towards a man who would thus disregard the truth at such a solemn time. Levy expressed his view on the subject, whereupon Casey remarked, "Levy, this town is too restricted to permit of the residence of two people holding such dissimilar opinions," and swisked out his gun. Levy replied, "Casey, I am not heeled," at which Casey said, "Go and procure your gun, Levy and when you come, come shooting." At this Levy slid up the street in the direction of his home and disappeared. Casey leisurely walked across the street to Phil Felsenthal's store, and stood there leaning against a post awaiting Levy's return down the street when according to his program he would proceed to perforate Levy and thus establish in Pioche the futility of any questioning of his own position.

Now Levy did not feel called upon to furnish his system as an open target to gratify the whim of Casey, or anybody else, so instead of boldly walking down Main street and inviting Casey to prepare the funeral he dodged around back of the houses and came down behind Felsenthal's store and approached Main street and Casey by a very narrow alley which separated Felsenthal's from the adjoining building. Casey was much startled by the sudden appearance before his nose of Levy's gun and at hearing Levy remark "I am heeled now, Casey." Casey had his gun in his hand, and raised it, but Levy's ball hit him in the right shoulder and crippled it, while the second entered his neck, penetrated the spine and in a few hours Casey was no more.

Dave Nagle and Jimmy Herrington, friends of Casey, were standing near and both began shooting at Levy.

One of the balls entered Levy's mouth, coming out under his right ear, and making it necessary for Levy to procure a set of false teeth before he could eat comfortably. But Levy soon recovered, went down to Tucson, Arizona, and was there shot to death on the Main street by some desperadoes.

The old Bible saying, "Whosoever sheddeth man's blood, by man shall his blood be shed," had frequent and striking exemplification in Pioche. One of the oldest and most reliable of the old timers here tells me that careful tally was kept of those who died a violent death and that the roll footed up seventy-nine. I was much amused the other day at a friend of mine, who is preparing a story of those strenuous times for publication. He had learned of the fate of the seventy-nine, and not knowing that I had heard it, he repeated it to me. He said that the bad men became such a terror that the vigilance committee took the matter in hand, apprehended seventy-nine, stood them up in a row, bound hand and foot and with eyes bandaged, then and there shot them to death, thus clarifying the moral atmosphere and accounting for the graves. From the earnestness of his manner I could not be certain whether he had succumbed as victim to this blood-curdling tale, or whether he desired to make me one.

Rich Strikes Start Boom.

The mining activity increased very rapidly. New strikes were made daily. New companies were formed with a recklessness which is unsurpassed even today and nearly, or quite all of them on the assessment plan, so that the papers were always full of notices of some new assessment levied. And such was the richness of the section and so many the veins which came to the surface that, as nearly as I can ascertain from the records, most of these companies obtained in their properties more or less rich ore. The following is a list of those which were most prominent. The General Washington, commonly called the No. 9, which belonged to the Pioche Silver Mining Company; the Washington and Creole, where the principal stone forts were erected, and which later compromised as the "Washington and Creole"; the old Panacker, which came to be known as the Panaca, Silver Peak, Boston, Desdemona, Richmond, Banner, No. 6, Alps, American Flag, Bowery, Columbus, Condor, Nightingale, Excelsior, Chapman, Barton, Lafayette, Caroline, Wide West, Ingomar, Romeo, Moltke, Amador, Ivanhoe, Huhn and Hunt, Newton, Booth, Vermillion, Peavine, Hoffman, Page and Panaca, Orient, Summit, Santa Clara, Chief of the Hill, Louise, Mocking Bird, Spring Mountain, Newark, Oneida, Koh-i-noor, Stirling, Orleans, Medissa and Lillian Hall. More than half of these had a standing on the San Francisco Stock Exchange where for several years the Pioche stocks shared the interests with those on the Comstock.

The Raymond and Ely Mining Company was incorporated in January, 1871, to take over the Burke and soon after acquired a large number of other claims, while both Raymond and Ely purchased very many claims which they continued to hold in their individual names. With the incorporation of that company there came C. W. Lightner to be its superintendent. He had formerly been president of the great Ophir mine at Virginia City. The Raymond and Ely company, under Lightner, soon started to sink a vertical shaft on the Panaca claim, which had been purchased by that company. This was the principal shaft in the district and the only vertical shaft of any moment which was sunk on the hill, all the other shafts being inclines of approximately sixty-five degrees dip towards the south. For over one hundred feet nothing startling developed, the ore being spotted, and only moderately rich. Then came the bonanza, which proved to be one of the most famous ever found in the United States. This strike was made in July, 1871. In August of that year Meadow Valley stock was selling on the San Francisco Exchange at $22 a share, and Raymond and Ely stock at $21 a share. In July of the following year Meadow Valley was selling at $17.50 a share and Raymond and Ely at $145.

As the mines were opened the howl for mills was almost pathetic. The Dry Valley Mill of the Meadow Valley company was increased very soon after it was built to a thirty-stamp with a foundry, machine shop and all the accessories of a thriving little town. But this mill, crushing over sixty tons of ore a day, couldn't take care of the product of the Meadow Valley company alone, much less of mines which had no mill of their own.

In the winter of '68 and '69 White Pine was at the height of its boom. In the three towns which constituted what was known as White Pine, Hamilton, Shermantown and Treasure City, there was a total population that winter of thirty thousand people. I do not take these figures from irresponsible tradition, but they are the dispassionate recollection of several men who were a prominent part of the life of that camp in those days. White Pine proved to be somewhat ephemeral. Its ores, while fabulously rich near the surface, seemed to change more rapidly with depth and to reach a combination not adapted to the Washoe process. I do not doubt that White Pine may have its resurrection. The future of Nevada is going to be greater than any man now realizes. But be that as it may, as Pioche came up White Pine went down, and while Pioche was begging for mills White Pine could not treat all custom ores brought and even the Meadow Valley company sent some of its surplus ores there for treatment. The distance was 260 miles and that company paid $40 a ton to get the ores hauled there. It was what is known in mining camps as "back-loading" and that is why it could be hauled so cheaply.

At Bullionville the Raymond and Ely "Pioneer" was soon supplemented by a ten-stamp; this was enlarged to a twenty, then what was known as the "Raymond and Ely Thirty" was built. Very soon after this came another ten, enlarged to a twenty, used for custom purposes, then another ten and still another ten. Stetefelt furnaces were erected to prepare the ore by roasting to yield up more of its silver and gold contents. A mill was built in Condor Canyon, five miles above Panaca, and another, called the Floral Springs mill, on the outskirts of Pioche. There was a custom mill at Silver Park, forty-two miles from Pioche and to this was sent all the ore it could treat at a transportation cost of $16 a ton. All the ore sent assayed above $150 a ton in gold and silver; the mill paid seventy-five per cent. of this assay value, less $20 a ton for treatment.

In 1873 the narrow guage (three-foot) Pioche and Bullionville railroad was opened from Pioche to Bullionville. It was the ambitious project of its founders to extend this road on the east to a connection with Salt Lake and on the west to a connection with the Central Pacific. Its engines were hauled in by mules, and when the railroad had ended its mission and Pioche had sunk to rest other mules came in and hauled them out again, but the connecting links with the wide, wide world were never built.

This railroad ran via Dry Valley and Condor Canyon and served the mills at all three places. Before it was opened a man named Ham Light, quite a noted character in the country, kept five fourteen-mule teams busy hauling ore to Dry Valley, while true to the compact entered into in the time of stress between Ely and Raymond and their Mormon friends the hauling to Bullionville remained in their hands. The rate always remained at $5 for the twelve miles. One of them whose memory of these accumulated fives is still green, told me last week that when he hauled his

farewell load to the Raymond and Ely Thirty before the iron horse supplanted him, one hundred and twenty teams by actual count loaded that day at the Raymond and Ely dumps for Bullionville. What all this meant in easy money at Panaca and Bullionville can be readily appreciated by those familiar with mining camps where lots of money is being paid out.

It is a rule for all thriving mining camps to have a big fire and Pioche was no exception. On the 16th day of September, 1871, fire caught in the afternoon in a restaurant and a very large portion of the town went up in smoke. There were no water works then, the wind blew almost a gale that day and the wooden buildings went like tinder. As always happens at such times, the mob lost its head, and this condition was magnified when barrels and cases of booze were carried into the streets for him who would to drink his fill. When this carnival of license was at its height a horrible explosion occurred in the cellar of Phillip Felsenthal's store and ten human beings were blown into eternity. It was the result of storing a lot of black powder in the cellar under the confident theory that the cellar was fire proof. Many of the cellars of the town did protect the goods stored in them, and thus famine was averted until fresh supplies arrived. It is interesting to learn that these which were ordered after the fire began to arrive within thirty days. For a camp so far from the railroad, without telegraph, it was not a bad record. In an incredibly short space of time the town was rebuilt very much more substantially than before. Even the local brewery was running full blast within a week at the old stand, dispensing its product at the same old price.

Son after things began to boom in Pioche strikes were made in neighboring camps. Highland, Comet, Stampede, Gap, Bristol, Freiburg Groom, Chief and others developed mines, many of which became great producers. The Mandha at Highland, the Bay State, now the Ida May, the Hillside, Mayflower (now the May Day), the Cave and the National were all famous in the early seventies and promise to be great producers in the future. The Jack Rabbit, also in the Bristol district, developed into an enormous producer. George W. Maynard, a noted expert, who examined the Jack Rabbit, reported half a million tons of shipping ore ready to stope in the Jack Rabbit above the tunnel level. Mr. C. H. Swanton, the able superintendent of the Nevada-Utah Mines and Smelters Corporation, tells me that the Jack Rabbit shows up better 400 below the tunnel level than anywhere above it, and that ore has been developed 500 feet below that horizon. The fact is that the Jack Rabbit has been demonstrated to belong in the class of enormous tonnage mines, but nowhere have the limits of that tonnage been defined.

The Beginning of the End.

As early as 1872 a reverberatory furnace was erected to treat the Bristol ores. This was changed to a water jacket in 1878 and ran for a long time very successfully on the ores of the district and the Mendha, and Bristol became quite an important smelter point. In the early '80s a Washoe process mill was erected at Bristol to treat the Mayflower ore. This also ran successessfully for a considerable period. About 1890 still another smelter was built at Bristol to treat copper ores which occur in great quantity and of high grade in some of the properties.

Stage facilities began at Pioche as soon as there was bullion to go out. In 1870 a tri-weekly line of six horse Concord coaches was put on between Pioche and Hamilton where it connected with coaches for Palisade, and another line of similar character was established between Pioche and Salt Lake. In a few months these lines were purchased by the veteran stage men, Gilmer and Salisbury, whose names were as intimately connected with early-day staging as those of Ben Holiday and Barlow and Sanderson.

As bullion increased so did the stage facilities. They soon ran four times a week, and then daily to Salt Lake and a little later daily to Hamilton. More than once the bullion went through the bottom of the stage like a trip hammer because of its excessive dead weight. The holding up of one of these stages was of frequent occurrence and between the reports of such events and runaways the monotony of existence in Pioche was much varied. The importance of this double daily line of six-horse coaches to Wells, Fargo and Company may be understood from the rate on bullion which was thirty-three cents a pound.

In wagon freighting the routes to Pioche were the most important long distance lines in the West. The two important railroad points from which supplies were hauled to Pioche were Palisade and Toano on the Union Pacific. Toano was the nearest and that route passed the present site of Ely. It was known principally as the bull team route, on account of the excellent grass.

The Palisade route was the one adopted by W. L. Pritchard for his fast freight mule line. This ran day and night, having regular stations where stock was changed just as for stages. The distance from Palisade to Pioche was 260 miles. Freight designed to go in five days brought a certain price per pound and was marked "Diamond One." Eight day freight brought less return and was marked "Diamond Two,"fifteen day "DiamondThree," and slow freight, "Diamond Four." In these days it appears that "Diamond Four" is the only classification for railroad freight and it is superfluous to specify it.

The first telegraph line into Pioche was built by the Mormons. It was called "The Deseret Telegraph Company, Brigham Young president. It was a great day for Pioche when the first wire annihilated distance. Exuberant communications were sent to President U. S. Grant at Washington, Governor L. R. Bradley at Carson City, Mayor Shelby at San Francisco, Senator William Sharon at Virginia City, Governor Woods at Salt Lake City and last, but by no means least, to Brigham Young, thanking him for his enterprise in placing the great camp of Pioche in touch with Lombard and Wall Streets and the world at large. The fact that it cost $3.50 to send ten words to San Francisco seems to have caused no depression of spirit whatever.

In 1873 the Western Union opened its line to Pioche via Hamilton and for years this was a most important and lucrative station for that company. After a time the Hamilton line went out of commission, but the Mormon line fell to the Western Union and through all the dismal years has kept Pioche connected by this nerve of industrial life with the great outside world.

The first hard jolt which Pioche experienced was when George Hearst, backed by the Ontario crowd, better known then as Haggin, Tevis et al., came in hunting spoil. They secured the Hermes claim, one of those whose principal reason for existence was the kind which appeals to the brigand and the pirate. A lawsuit was initiated and the events of the trial are among the most realistic memories of the old-timers. To hear them tell how the jurors were purchased like sausages reminds one of Lawson's narrative of the debauch of the Massachusetts Legislature. In all the putrid mess there was one man who kept his name pure and untainted and that was Mortimer Fuller, the judge of the district, who presided at the trial. After the jurors had delivered the verdict Judge Fuller promptly set it aside and ordered a new trial. But Billy Raymond and his crowd, realizing what they were up against, purchased the control of the Hermes stock at a high figure, and George Hearst and his associates passed out of the game.

The climax came in 1875. Raymond and Ely had become multimillionaires, measured by the market value of their interest in Raymond and Ely stock and other mining properties. But they were thoroughly inoculated with the microbe of stock gambling. The Comstock bonanzas had set the Pacific coast stark crazy. Raymond and Ely were in the thick of the fight, their Raymond and Ely stock put up as collateral, when, without warning the great bank of California closed its doors.

Billy Raymond and John Ely lost practically everything, and it is said that when they shook the dust of Pioche from their feet they called upon the Ruler of the Universe to avenge their wrongs and to cause grass to grow in the streets of the town.

In the Calico district of southern California Billy Raymond partially recuperated his shattered fortunes before he died. The fate of poor John Ely injects a somber line into this story. A victim of his convivial nature, this son of the frontier, soldier of fortune, beloved of his fellows, who had lived perhaps as he ought not to have lived, died at any rate a jolly fellow, and is deeply mourned to this day by all who knew him.

A New Regime.

A new regime came for the Raymond and Ely, but it is said that wisdom had departed when Raymand and Ely went out. Water had been struck at the twelve hundred level and quarrels arose as to how it should be kept pumped out. The Meadow Valley had ordered a fine Cornish pump which had partially arrived, but before it could be installed the Raymond and Ely management stopped pumping, the mines were drowned out, and that was the end.

Time fails to tell of the spasmodic efforts made to arouse the corpse of the town which died when the mines shut down. That they could ever have been run at all under the adverse conditions then existing is a marvel of mining history. Upon the hillside south of Pioche are dumps which contain hundreds of thousands of tons of material which will pay for treatment. The coming of the railroad will change every element of the situation. There is more ore known to exist in the mines here than has ever come out. What that product has actually been in cash will never be known, but from the best information obtainable I believe it to have been over $40,000,000. In the old tailing dumps at Bullionville, Dry Valley and Condor Canyon conservative engineers have measured up over four millions of value. In Pioche and its tributary camps millions of tons of ore that we know of await the coming of the railroad and from the known record of the past we are justified in believing that but a fraction of what exists has yet been disclosed.

Pioche was once one of the most extraordinary mining camps of the time because the ore was so rich it paid in spite of the most shameful of waste. Under modern conditions of transportation, ore treatment, copper, lead and zinc values (all three of which metals were positively a detriment then) Pioche will come into a new life. Its surrounding territory has been hardly scratched and no part of this wonderful state offers more certain returns to the prospector. Abundant water, a climate unsurpassed, a market to buy supplies in and to sell ores in in any quantity for their present-day value, and the natural richness of the whole mineral field will make it an Eldorado for the mining man of high and low degree.

THE PRODUCTION OF GYPSUM IN 1906.

The gypsum mined in the United States in 1906 amounted to 1,540,585 short tons, valued at $1,147,129.

This production represents an increase in the quantity of more than 47 per cent. and in value of nearly 40 per cent., as compared with that of 1905, and exceeds that of any previous year.

The material is produced in 17 states and territories besides Alaska, and in connection with the mining, mills for grinding and burning it are operated at nearly all the places of production. As to relative rank among the states producing gypsum, Michigan still holds first place, New York regains second place, and Iowa is a close third. The other states show few changes since 1905, their present rank being as follows: Texas, Ohio, Oklahoma, Kansas, California, Wyoming, Virginia, Nevada, Oregon, Utah, New Mexico, Colorado, South Dakota, Alaska and Montana.

Gypsum occurs in sedimentary rocks of practically all ages, either in the crystalline form or as rock gypsum, and it is widely distributed over the world. It is found commonly in the vicinity of beds of rock salt. In the United States workable deposits are confined to beds of rock gypsum, which occur at comparatively few geological horizons. New deposits of gypsite—the earthy, granular, form of the mineral—are reported to have been recently discovered in Riverside county, California, and many newly developed deposits are reported from other parts of the country.

The bulk of the gypsum produced in the United States as well as in foreign countries is manufactured into various plasters, such as plaster of Paris, stucco, cement plaster, flooring plaster, hard-finish plaster—and a steadily increasing quantity is being used as a retarder in Portland cement. Refined grades of plaster are used in dental work and also as cement for plate glass during grinding and as an ingredient in various patent cements. Considerable quantities are ground without burning and are then used as land plaster or low-grade fertilizer, while smaller quantities are used in the manufacture of paint and paper, imitation meerschaum and ivory, and as an adulterant. The pure white, massive form, known as alabaster, is much used by sculptors for interior ornamentation.

An interesting use to which gypsum is put, especially in England, is the Burtonization of beer. The reputed excellence of certain British beers, notably those of Burton and Newark, is attributed to the presence of calcium sulphate in the natural water used in their preparation. It has been calculated that 350,000 pounds of gypsum are annually imbibed in potations of Burton beer, and since gypsum is soluble to a certain extent, attempts have been made with varied success to add similar artificial salts to water not derived from gypsum-bearing beds, and large quantities of gypsum are purchased by brewers in England for this purpose. This addition, although advantageous, does not produce so perfect a combination of salts as that existing in the natural waters of Burton-upon-Trent.

An advance chapter from "Mineral Resources of the United States, Calendar year 1906," on gypsum and gypsum products in 1906, by Ernest F. Burchard, of the United States Geological Survey, is now ready for distribution, and copies may be obtained free of charge by applying to the director of the survey at Washington, D. C.

ALLIS-CHALMERS.

While no official action has as yet been taken it is stated on very good authority that William V. Kelley will supervise the management of the Allis-Chalmers Company.

Mr. Kelley is president of the American Steel Foundries, and has placed that company in an excellent condition, physically as well as financially, as shown by the annual report just issued. From a deficit of $600,000, shown several years ago, the earnings last year were in excess of $3,100,000

Mr. Kelley, it is said, will continue as president of the American Steel Foundries Company, and his connection with Allis-Chalmers will be in an advisory capacity only.

It is admitted that certain other changes in the management of the Allis-Chalmers Company are contemplated.

Mining News from the Many Camps

ARIZONA

Phoenix—In a recent interview with Frank H. Horn the well known Kansas City promoter he said:

"I believe that the end of 1907 will see Arizona leading Montana in the production of copper."

"This opinion," he continued, "is shared in by most of the mining men in the East. For three years Arizona has been gradually climbing up until it has passed Michigan, and is now a close second to Montana."

Asked about mining investments in the West, he said: "During the past twelve months more eastern money has been invested in new mining enterprises in the West than was put in during the previous fifteen years. I know this is a broad statement, but it is the truth."

Mr. Horn is promoting the Two Queens property near Winkelman, and is interested in Nevada mines.

Mr. Horn is also interested in the Mansfield Mining and Smelting Company.

Affairs are 'moving along swimmingly at the Mansfield," said Mr. Horn. "There is now enough ore on the dumps and blocked out to keep a large smelter running a year, and the values as indicated by the assays are higher than has really been hoped for heretofore. The smelter project is the next important undertaking that faces the company and it will be taken hold of at once. A quantity of stock has been set apart for sale through three different brokerage firms, at sixteen cents a share, the proceeds of the sale to be devoted to no other purpose than the construction of a smelter. In the past year or so the company has been somewhat embarrassed by the competition of the stock of one of the promoters with the treasury stock, which kept the price down and destroyed the market temporarily. This promoter, however, has been bought out entirely and there is now nothing to bear the market either as to price or demand, and Mr. Horn says he has no doubt that the necessary money for smelting construction will be forthcoming immediately.

Florence—The old Reward copper mine, a patented property situated in Pinal county, thirty miles south of Casa Grande, a station on the S. P. R. R., has been sold to Bisbee capitalists, consisting of Henry B. Hovland, L. C. Shattuck, Hoval A. Smith, S. R. Kauffman and E. N. Breiting.

The new company will be known as the Casa Grande Development Company and the gentlemen named above are the directors of this new organization. Charles S. Morris, for many years superintendent of the Highland Boy smelters in Utah, will be manager of the mines and smelter.

The company is capitalized for $500,000, divided into 50,000 shares of the par value of $10.00 each. Forty thousand of the shares have been sold on the installment plan and 10,000 shares have been placed in the treasury as a reserve fund. On the 40,000 shares subscribed for, a call for $1.00 per share has been issued. This will give the company $40,000 cash to meet immediate expenditures. A second call for $2.00 per share will be issued about December 1st of this year.

The property consists of about 850 acres of mineral ground and has been worked at intervals ever since 1881. A thirty-ton copper jacket was installed on the Reward mine many years ago and at different times high grade matte and blister copper were turned out of this furnace, but the plant was too small to make its operation profitable and the management seemed to have been impracticable.

Jerome—The decline in the price of copper has in no way interfered with development work along the great Jerome copper belt, nor cut down the production of the United Verde mine. This is due to the well known fact that all of the ores in this district carry gold and silver in pay quantities. Panics may come and go, but the development of the Jerome copper belt will go on forever.

Conditions at the United Verde mine have never been better than at the present time, both in the mine and at the smelter. The settling of the smelter has been entirely stopped and the machinery connected therewith is running without a hitch. The large new furnace which is being erected under the direct supervision of Superintendent Tom Taylor, in which will be incorporated many new ideas of the superintendent, is being rushed ahead as rapidly as possible. The long tunnel was in 1,534 feet on the 15th of this month. When completed this tunnel will be 7,208 feet in length. An extensive piece of work now being done by the company is the rebuilding of Walnut Spring dam. This new dam is intended to turn all of the waters from this spring into the pipes leading to the smelter, to accommodate which the two miles of eight-inch pipe from spring to smelter, is being replaced by ten-inch pipe. At Jerome Junction the company has completed a 500,000 gallon oil storage tank.

Wickenburg—J. M. Fike and his two sons have just returned from doing some assessment work on the Quishenberry group of claims which they own in the Castle Creek mining district, twelve miles up the creek from the hot springs and one mile from the Crown Point mine, owned by Colonel Brodie. The property is a historic one, having been worked when the ore was taken by freight team to Ehrenberg on the Colorado river, and thence by steamer to San Francisco for reduction. The ore shipped in those days went as high as eighteen hundred ounces per ton. It had to be very rich to pay the transportation charges.

Silver, copper and lead ores are found together in places, but most of the recent development work has been done on some claims particularly rich in galena. Mr. Fike brought home with him some samples of galena float picked up below the ledges, which run sixty-six per cent. He says he has a considerable quantity of the same kind of ore on the dumps.

On the latest visit to the property a new copper and silver ledge was found that is most promising though it has not been extensively exploited yet. It is only four inches wide on top, but the ore is wonderfully rich, having assayed fifty-four per cent. in copper. Mr. Fike brought some nice specimens of it back to the city. The ledge is exposed for about a hundred feet in length and has been traced considerably further.

Kingman—The Gold Belt will not be affected by the recent decline in the price of copper, except that extensive sipments will be discontinued and the ore piled on the dump for further reference. The Gold Belt does not depend alone on its copper values, and will be one of the biggest gold propositions in the territory. Development work at the 200-level of the gold shaft is furnishing most gratifying encouragement. An abundance of water has been encountered and under present conditions is a nuisance, but will be of great advantage when a milling plant is installed. The management of the company is now satisfied that enough gold ore is in sight to warrant the erection of a mill of fifty-tons capacity, and the values run high to insure good returns. The mill is now being figured on and if it is decided to have it, no doubt there will be a new issue of the stock placed on the market for its erection.

The big mill of the Victor Gold Min-

ing Company, at Vivian, is assuming shape and will be ready to go into commission as soon as the power plant at Needles is completed. The mill is to be one of the most up to date plants ever constructed on the Pacific coast.

Tucson—The Black Diamond Copper Mining Company is advertising for bids for the sinking of an additional hundred feet in a shaft at the company's property in Cochise county, which is now down 115 feet. The dimensions of the shaft outside of the timber are ten by six and in the clear eight feet eight inches by four feet six inches.

Sasco is a genuine surprise. Everyone who visits the new town says so. Its size, even at the present time is a revelation and it will be at least three months yet before the big buildings are completed.

The gigantic steel skeletons of the smelter and power house are fast taking shape. All the steel work has been practically completed on both buildings and in a short time the work of installing the smelter will be under headway. Already part of it has been placed within the structures.

"We expect to have both the smelter and the power house completed by January 1st," was the statement made by Superintendent Meade Goodloe, who by the way, was a number of years ago, a professor in the University of Arizona in Tucson. "It may take longer, for the work is gigantic, but we are confident that the smelter can be blown in by New Year's day of the coming year."

Every one in Sasco is optimistic. The residents there see a second Douglas. They believe that it will be but the briefest time before Sasco will be the first city in Pinal county, and expect within five years to give Tucson a hard race for population.

Douglas. — The Shattuck-Arizona continues to produce about 400 tons of ore daily, one-half of which is oxide and the other sulphide. The former goes to the Copper Queen smelters at Douglas for treatment, while the latter is handled at Globe. Most of the ore is being taken from the 700 and 800 levels, although some of it comes from the 900, where a body of low-grade ore was encountered some weeks ago. The winze which is being sunk on the Leo claim at the 800 level continues in high grade ore, proving beyond doubt that the deposit is one of very large dimensions.

J. E. Leeper, general manager of the Arkansas-Arizona, has returned from a business trip to Arkansas, where he renewed his successes in handling his company's stock. At the mine the shaft was sunk and timbered seventy-eight feet last month, the bonus for which brought the miners wages up to $5.40 per shift. It is hoped to more than equal that record this month.

General Manager Hull reports two shifts at work in the south drift from the 1888 shaft, one of the Hull Copper company's claims, with the ore body increasing in size as progress is made. He also reports the discovery of deposits of native copper in the Cleopatra Copper Company's ground.

Globe.—A. B. Broadhead, a prospector and mining man of intelligence, who has been investigating the mineral deposits of the Gila range, reports a very unusual discovery. A ledge of ore containing a metal known as Modock gold or Roman alloy was uncovered, and being mistaken for gold, Mr. Broadhead thought for a time that he had made a tremendous discovery.

The metal closely resembles gold, although when separated from the rock it is lighter and has some of the qualities of aluminum. The discovery was made several weeks ago, but was kept quiet and the finder took samples of the ore east in order to find out what it really was.

The specimens were treated in the laboratory of Columbia University, New York, and pronounced Roman alloy. Mr. Broadhead stated upon the authority of the university that this was the only deposit of the metal known to exist within the United States.

The ore is quite rich in the metal, showing above sixteen per cent., but since its value is less than copper, it is not probable that it could be mined at a profit. It is used quite extensively in the arts and in manufacturing.

COLORADO

CHAFFEE COUNTY.

The older camps of this county are working about their usual complement of men and several new properties are heard from quite frequently. Five or six of the more developed mines in the Turret district are working their normal complement of men, developing, equipping, outputting and similar employment. At Sedalia, Monarch and other camps, mining operations are fairly active and the Record reports a valuable strike by H. E. Barns in the Cottonwood Creek district. There is a popular idea that the day is not far off when Cottonwood Creek will prove to be one of the greatest copper camps in the state. The district was worked many years ago by wild diggers with crude appliances, but it was never properly developed until recently, when N. E. Barnes, or the Cottonwood Creek Company, entered the field with modern appliances and has proven to old prospectors and mining men that they had been walking for years over great deposits of copper. The undeveloped mineral wealth of the section cannot be estimated, but there is for a certainty a great mineral zone that is practically one of the largest in the district. Taking it all in all, there are few localities which offer to the prospector and investor for making money better inducements than the district of Cotonwood Creek.

N. E. Barnes, the president of the Cottonwood Creek Copper Company, was a specially invited guest to the banquet given by the Salida Board of Trade, and learning what enormous copper veins had been opened up by the Cottonwood Creek Copper Company, and it having come to our notice that Senator Clark was endeavoring to secure control of the mother lode copper vein of Colorado, which is owned by the Cottonwood Creek Copper Company, our representative interviewed Mr. Barnes at the Harvard hotel, with the purpose of getting the facts direct from first hands. He assured us that no one person had or could obtain control of the stock, although efforts had been made to do so. It may be possible that this rumor about Senator Clark trying to get the control is from the fact that J. A. Bellefeuille, who was formerly associated with the United Verde mine in Jerome, Arizona, reported on the Cottonwood property at the request of some European stockholders.

Nearly all of the stock accompanied by bonds has been sold to the personal friends of the directors in Europe. Mr. Barnes further stated that it is quite true that a small portion of the unsecured stock had been sold on the New York market, merely to get an expression of opinion of the American public, but that no more was for sale. The last purchase made on the New York curb was at 4⅝.

Reports from the mine show the great value of the Copper King claim improving every day and a shipment of valuable ore from this claim will be made very shortly. Some of the ore already taken out is exceptionally rich. M. D. Stecher, one of the directors, recently visited the workings and selected a fair sample of ore from the shaft and had it assayed by Messrs. Thomas J. Dee & Co., of Chicago. The returns in copper show 43.24 per cent, valued at $172.96 per ton. From the reports of competent mining men, this property will prove to be a rich producer and a big dividend payer.

The company's plant is equipped to do a lot of deep work, and the views of James H. Freeman, the Cripple Creek expert, who first examined the

ler of Denver, as manager. A larger boiler has been recently installed and the tunnel is being made large enough for double track. The company owns a large group on the south side of South Boulder creek, has splendid water rights and a large acreage of good timber. It is reported that the tunnel will eventually be extended to cut the Perigo, Gold Dirt and other well-known veins in the Gambell gulch and Tip Top sections, acting as a transportation and drainage tunnel for these great properties and cutting them at greatly increased depth.

Several promising tungsten locations have been made in the Pactolus territory, lying north and east of Rollinsville, in Gilpin county, and it is believed that some good shippers will be developed within the next few months on that property. Tests already made have shown a good percentage of tungsten and some vigorous development and prospecting work will be carried on as long as the open weather lasts. The territory is owned by the Perigo Mine and Power Company which recently purchased the Perigo and some other mines and holdings of Potter and Lightbourn, the Central City bankers.

Etienne A. Ritter of Colorado Springs has been appointed manager of the Evergreen Gold & Copper Mines Company, operating in Pine Creek district. Arrangements are being made for active resumption at this copper producer. The company has decided to install a large air compressor for heavier developments, and will also figure on the erection of a concentrating plant to treat their low grade copper ores at the mine, with the future intention of building a matte smelter.

Wheeling, West Virginia people, who are interested in the Metha group on Montana hill, southwest of Apex, will install a larger hoisting plant for deeper workings, and will also drive a tunnel for the drainage of the property. Good ores have been opened up in sinking, and the company has also entered into negotiations for the purchase of adjoining claims, and will keep up heavy work during the winter season.

Eastern and British capital is being interested in the War Eagle group, situated between Lump gulch and Perigo, which was among the earlier producers in that section of the northern districts, the surface ores giving high returns along with the gold dirt and others.

As the result of a run on Perigo ores, the company's mill in Gambell gulch shipped three carloads of concentrates during the past week, and teams are still busy hauling from Gambell gulch to the Moffat railroad at Rollinsville. A large number of leasers have taken blocks of ground in the Perigo mines and the production will soon be doubled.

The Golden Flint property on Tip Top mountain is among the steadiest operated mines in these districts. Some good ores have been opened up in both the shaft and tunnel workings. Denver and Eastern people are interested. They have taken a lease on the Daisy mine in Gambell gulch, owned by the estate of the late James A. Gilmour. The mill is being overhauled and new coppers are being put in, so that it can be kept running all through the winter if the water supply is ample. The Gilpin-Independence Mining Company is the operator.

The King Bee Gold Mining and Milling Company of this city owns and is operating one of the largest combinations on the line of the Newhouse tunnel. Its properties are located on Pewabic mountain, Russell district, Gilpin county. The present management are inaugurating a line of development that will soon place it in the front rank among the largest producers in the state. They have about completed the installation of three machinery plants at the surface, and will commence operations in the Newhouse tunnel by driving lateral drifts on the Wellington No. 6, which now produces ore ranging in value from $17 to $150 per ton in car lots.

They will also extend a lateral on the Compeer, which is a large vein mineralized for six feet in width. This lateral will be continued as far west as the Iron Duke mine, some 2,000 feet, and on to the east end lines of the Iron mine of the Pewabic company. It will give the Compeer a block of ground 1,600 feet above the lateral and 2,000 feet in length. The requisite machinery equipment for this has been purchased and will be placed on the ground as rapidly as possible. The surface showings on the King Bee property are exceedingly favorable, good, workable ore having been demonstrated at twenty different points on the outcrop. The Clifton Bell mine, belonging to this company, is now under active operation, and as fast as new ground can be opened men will be employed.

The company owns twenty-nine claims in a compact body. On its west end lines are such noted mines as the Iron, Pewabic, Old Town, and Grasshopper, and on the east it endlines on the Druid Mining company's claims i. e., the Hazelton, Quandary and other large veins. The King Bee aggregation is bisected by the Newhouse tunnel, is covered with valuable timber and has the only spring furnishing good water in Russell district. It has all the conditions for cheap development and will be a very productive proposition. The management are working three shifts at the surface on the Gilpin slope of the mountain, and extracting considerable ore. The vein vary in width from two to eight feet, and the ore is of a sulphide character, worth from $7.00 up to $60.00 per ton. the metals are gold, silver and copper, with very little lead. It makes an excellent smelting and concentrating product. Operators have been delayed by the impossibility of getting machinery delivered on time.

The work being performed by this company, together with the plans that are to be executed in the near future, which means as soon as its mechanical equipment shall have been installed and put in working order, contemplates the very extensive regeneration of a large area of superior mining ground that has been practically idle for a long period. It adds a fourth great factor to the Old Town, Pewabic and Jefferson-Calhoun in the general scheme of making Russell district the most important mining divisions of Gilpin county. The head and inspiring force of the King Bee combination is R. L. Martin, one of the best known progressive spirits of our time. There is a great opportunity here for developing an immense mining project, both from the surface by a series of shafts and by laterals in the Newhouse tunnel. If Russell district could be furnished an adequate supply of water for reducing ores on the ground it would be followed by large concentrating works. But as this essential force is not to be had, the Gilpin county tramway, owned and operated by the Colorado & Southern Railroad Company, will be the medium of transport. The writer stated some weeks ago that some important enterprises were in process of consummation in and about Russell, and this is one of them. Again, it will not be long before the Hot Time lateral of the Old Town reaches its objective. We shall then see further important advences in the life of that district.

HINSDALE COUNTY.

This part of the mining world appears to be keeping step to the music of the pick and shovel, hammer and drill and other evidences of mining activity. A writer in the Phonograph says the northern slope of Engineer mountain, the southern portion of which is called American Flats, witnessed a wild rush in 1882. The ground staked was nearly equal to the productive area of Cripple Creek. As early as 1878 the Palmetto mine had shipped ruby silver ore running $500 per ton, but no unusual attention was

paid to the section until the Frank Hough mine was opened in 1882. The Hough ore was not nearly as rich as that found in the Palmetto, but the fact that a prospect hole was started on a seam and in a few feet in depth broke into a great body of smelting ore, appealed to the speculative imagination of every one and in almost a day the slopes of Engineer bristled with stakes.

After producing 2,000 tons of ore running 25 to 27 per cent. copper, 50 to 60 ounces silver and $2 to $5 gold per ton, the Frank Hough closed down with a big body of ore in sight and the Palmetto ran its workings off the vein and also closed down.

Engineer mountain, in Hinsdale county, is situated in the northeast portion of the Silverton quadrangle. It affords a comprehensive view of the upper Henson creek lode system, in which is included Copper mountain. Looking south from Engineer into San Juan county, the vision travels along the mountains and across the ravines which are traversed by the great lode fissures of the San Juan, which in the vicinity of Engineer mountain trend slightly east of north.

The view covers the scene of the greatest mining activity of the San Juan country. Well considered investments, matured plans of development, trained business management and scientific methods of production are making for this portion of the quadrangle a record that will wipe out the errors of earlier days and demonstate again the unsurpassed permanency and constant values of the San Juan lodes. At the present time these operations have passed the top of Engineer mountain from the south and the occupation of Henson Creek slope has begun.

Two hundred feet below the surface a drift was run through solid ore sixty feet wide in the Frank Hough mine. This drift, six feet by four and one-half feet, produced 100 tons of bornite or black copper ore of the value given. After the lapse of twenty-five years, Mr. A. E. Reynolds, one of Colorado's leading mining men, has recommenced operations on the Frank Hough.

Less than two-thirds of the mineralized territory of this section is staked, claimed or patented, the rest is public domain. The writer knows of claims staked recently, which show croppings four and five feet in width carrying high gold and silver values. The claimed and patented ground covers some veins of extraordinary surface width and value, and for the privilege of being an unannounced prophet, I predict that in the very near future the northern slopes of Engineer will be peopled with a sturdy army of miners, three thousand strong. The example of the successful mining man is a powerful incentive to discovery, development and production.

There is no other area of like extent in the San Juan country that excels this section in surface showings. Lying fourteen miles south of Lake City, in Hinsdale county, covering the northeast trend of the great lode system of the San Juan, which contains all the great mines from the Smuggler-Union on the west to the Gold Prince on the east, the northern slope of Engineer and the upper Henson creek, after lying dormant for twenty-five years, is coming into its own.

This section shows indications which lead to the belief that here will be uncovered one or more great gold mines. While most of the bodies carry chiefly silver in the copper base, some very rich gold ore has been sampled from several of the lodes. Comparisons are odious. Nevertheless, if it were possible to transport this section bodily to Goldfield or Tonopah, it could probably be readily sold for $1,000,000,000, without firing another shot. As soon as capital is made to realize the true value of this section; after the prospector and miner have worked a little more and demonstrated that in this section, long rich ore shoots and enormous deposits lie hidden beneath the promising surface, upper Henson creek will become a veritable beehive of activity.

LAKE COUNTY.

Leadville reports the usual activity in that district, with increased tonnage and values for September. The Empire and Union gulches, to the south of the Leadville district, have shown unusual activity during the entire season.

Considerable prospecting has been carried on and a number of claims have been put on the producer's list. Principal among the latter is the Grand Views, owned by the Hurms and located near the head of Empire gulch. Several shafts and tunnels have been run on the difierent claims, and recently several tons of ore were sent to the local smelter as a test, which gave returns of fifty-seven ounces silver, sixty-seven per cent. lead and nine-tenths of an ounce gold per ton. Indiana parties are interested and are financing the proposition. The formation is a lime-porphyry, with dikes and faults running through the gulches the same as in the Leadville district proper, and every shaft or tunnel already driven shows mineral possibilities of undoubted merit. In Little Union gulch Al Rivers, an experienced Leadville miner, has been at work on the Cottontail claim for the summer, has sunk a shaft 112 feet, and has also driven a tunnel ninety feet. Recently he started a crosscut from the bottom of the shaft, opening a seven-foot vein of ore, which, although low grade, he believes will, with more development, turn into a good paying body of ore.

To the north of the district, in Big and Little English gulches, as much activity is noticed as to the south of the district, and extensive preparations are being made at different properties to continue work during the winter. The Bug Gold Mining Company is considering a proposition to drive a long tunnel into the mountain to develop its property and also drain the hill of water. This company has done considerable work on the surface, which has proved up a large body of low-grade gold milling ore, but the work has been retarded by water, hence the long development tunnel. The Big English Mining Company will resume operations for the winter in a few weeks. On one of the claims a shaft is down 150 feet, with an exceptionally good showing at the bottom. A tunnel has been driven thirty feet on the upper claim. The company has installed an excellent plant of machinery. On the Kankakee claim Louis Franke has driven a tunnel about 500 feet and during the week opened a vein of quartz that runs $30 per ton in gold.

It is said the drop in the prices of copper will make considerable difference in the value of the yearly output from Leadville. At present the district is producing in the neighborhood of 800,000 pounds of copper per annum, and with the loss of seven cents per pound on this heavy tonnage runs into money quickly. The properties that produce the heaviest tonnage of copper are the Little Johnny, Iron-Silver, Cleveland, Garbutt, etc.

The showing made at the Mammoth, in Big Evans gulch, indicates that there is a large body of ore trending through that portion of the gulch. This has induced Thomas F. Walsh to make preparations to sink a shaft on the Roy group of claims, which side line the Mammoth tract. It is stated by J. W. Benson, who has charge of Mr. Walsh's mining interests, that work will be commenced on the group by October 1st, and that the shaft will be sunk for the first lift 600 feet. The Roys are situated to the northeast of the Mammoth and on the hillside, and the proposed shaft will be fully a mile from any producing property. Should the ore shoot be opened here it will stimulate mining wonderfully in the

gulch and induce the owners of ground to get busy and develop the ground that they have allowed to lie idle for so many years.

The price of copper is being watched by many Leadville operators, with considerable interest says the Herald-Democrat. The loss of approximately seven cents a pound in the past few weeks, make a difference to several properties where copper is a by-product. In the Ibex there are large deposits of this metal, and the lessees on the Garbutt have been shipping a fine grade of material. The Iron Silver mine also sorts out copper sulphides. When copper ranged from twenty to twenty-two cents a pound the producer usually figured on receiving $4.00 per unit. The smelter usually does not pay for copper, however under one and one-half per cent. The total annual production of this metal in Leadville is between 700,000 and 800,000 pounds.

The International Company at Robinson, which is sinking a deep shaft there, has cut through the first body of sulphides and is continuing the shaft to reach another contact. Several weeks ago the ore was encountered at a depth of 1,100 feet. It proved to be fourteen feet in thickness. there being eight feet of lead, four feet of zinc sulphide and two feet of low grade. The question as to whether this was the main Robinson shoot has been decided by Manager Shepherd in the negative. It is a new ore shoot entirely, he states, and resting on a lime ledge that has heretofore been very little prospected, as it has not yielded values. He calculates that the Robinson shoot will be found about fifty-five feet below the upper shoot.

James W. Bailey, the veteran mining man, who is at the head of the French Mountain Mining Company, is in the city. The company owns an extensive acreage on French mountain, and has erected a $100,000 mill for the treatment of the ore. An immense fissure vein has been opened with a hanging wall of black gneiss and a foot wall of schist. It was first opened and followed in a tunnel above, but a crosscut tunnel has been run, cutting the vein at a depth of 660 feet. There are places opened ten feet wide where the values will average $30 per ton.

Mr. Bailey has been considerably annoyed by the starting of injunction proceedings against the company by the owners of adjoining ground attempting to contest his right to follow the vein as it passes out of the side-lines. The suit, however, does not interfere with the extensive campaign of development being carried on.

The Morning and Evening Stars on Carbonate hill are enjoying a period of more than usual productivity. Manganese and argentiferous iron are both in good demand, and half a dozen shafts, some of them close to grass roots, are producing considerably over 200 tons daily.

The Covey lease on the Hibschle is getting out a carload a day of good grade lead carbonate ore from the new body recently opened in the south. In addition considerable development work is under way, and it is expected that the tonnage will soon be increased.

Major Bohn is preparing for the electrification of the Auroras in Iowa gulch. He will probably put in position an electric pump for the purpose of draining the interior shaft in the Ready Cash tunnel. More properly speaking, this is an incline, but full of water, and there are indications that the vein is to be found below.

The Big English Mining Company is also preparing for an active campaign. It has a shaft down considerably over 100 feet and the tunnel in the upper claim is in thirty feet. The company has a good plant of machinery on the ground, and the showing in the bottom of the shaft is exceptionally encouraging. S. A. Osterhout, a veteran mining man, is the manager and will probably be here shortly to resume operations.

One of the most encouraging finds in the Big English section has been recently made by Louis Franke who is running the Kankakee. He has a long tunnel in and a few days ago encountered a vein of quartz ore carrying values as high as $30.00 in gold. Mr. Franke has been operating in the Big English section for several years, and the Kankakee is an enterprise to which he has devoted most of his attention.

During the past summer there has been considerable placer work on a large scale in the lower end of the county. Mr. Felton has been doing some hydraulic work below Hayden's ranch and the concern financed by Chicago parties which purchased the Lord ranch and other property has been cleaning off considerable soil to reach the pay gravels.

Old placer men, however, state that in order to make a success of this sort of mining dredges are necessary, as this insures the handling of a large amount of ground and that at the minimum of cost. The greatest obstacle in the initiation of dredges is the preliminary cost, a dredge with all the adjuncts necessitating an outlay of $60,000 to $70,000. It is believed from careful examination that there is ground in the Arkansas valley that is well worth the expenditure. It is expected that the Xumo placers will be thus equipped in another year, this territory at the mouth of Colorado gulch being very rich.

Manager John R. Curley of the O'Donovan Rossa has completed the station at the bottom of the shaft and is now driving out to the west to cross the fault, which will take him into the mineralized zone. The formation in the bottom of the shaft is badly broken, showing the extensive character of the fault action. According to the last geologic description by Professor Emmons the Pendery fault is the main break in the down town section, and the area of disturbance is in many places quite extensive.

There promises to be a more than usually active campaign of prospecting this fall and winter in the English gulch section. Among other work which is being projected is a long tunnel from the bottom of the valley that will pierce the mountain and tap the ore deposits of the Bug Gold property. This company has an extensive acreage and the development, while flattering, has not been sufficiently extensive to yield profitably. This projected tunnel will drain the entire section, and as the side of the mountain is very steep depth will be gained rapidly.

Kenneth Chisholm, of Twin Lakes, was in the city yesterday and reports a decidedly active year in the Twin Lakes district. Lincoln gulch in particular, is attracting considerable attention, as the Ruby mine located there is now one of the principal producers. The mill is treating thirty tons a day, the concentrates being shipped to Aspen. The rich ore is being sacked, this ore being worth $10,000 a carload. The Ruby mine is owned and operated by Aspen people.

On the Professor claim in the same gulch the Penny boys are shipping ore that yields $200 per ton.

Messrs. Hughes and Osborn have a group of claims adjoining the Ruby and in an open cut they have developed a vein which is in places seventy feet wide.

William Chisholm and Charles Brown are sacking ore from their claim not far from the Ruby.

New capital is rapidly coming into the gulch, and Mr. Chisholm says that the present activity will continue all winter.

In the immediate vicinity of Twin Lakes there is much prospecting activity with occasional shipments of high grade mineral.

One of the important mining propositions recently consummated is the securing by the Ohio and Colorado Smelting Company of a valuable group of claims in the Horseshoe district. They include the Tip Top and Last Chance, which were recently operated by Hugh Dyatt. The O. and C. Com-

pany has placed Harry McKeen in active charge, and the ground will be worked on a large scale by means of modern machinery. The tunnel workings have developed one of the most extensive lead-silver deposits in the district.

There is a well authenticated rumor that Thomas F. Walsh will in the near future sink a shaft on the Roy group of claims in Big Evans gulch. Some time ago Mr. Walsh was in the city and purchased the group, which lies near the Mammoth. It was shortly after the first strike of mineral had been made by Major Bohn, and it appeared to be conclusively demonstrated that there was a large ore shoot in that section. At the time, the summer of 1906, Mr. Walsh said that he had always regarded Leadville as one of the best mining districts in the country, and while he would be in no hurry to begin the new work here, that ultimately he would develop the territory he had purchased. Mr. Benson who is looking after Mr. Walsh's mining interests, has been recently going over the ground and has decided to sink a deep shaft northwest of the Mammoth.

This new enterprise in this particular section of the district will prove of the greatest importance, because it is at least a mile from a producing property, and there are possibilities for the opening of an ore shoot in a section that has not felt the magic of development outside the Mammoth, since the early days, when some shallow shafts attest the restless activity of amateur prospectors.

In the south branch of Little-Union gulch Al Rivers has been working his Cottontail group. He has one shaft 112 feet deep and a tunnel in ninety feet. While crosscutting at the bottom of the shaft a seven-foot vein was struck, which is just under pay.

Mr. Rivers expected to go out to his claims yesterday, and why he did not is not a part of mining news, but it has human interest nevertheless, because Rivers has lost a faithful friend on all his prosepcting trips, his famous horse, Blucher. Just as he was starting for the property yesterday the animal sank down and breathed its last. Rivers has taken his loss much to heart, as the old horse has been his constant companion in his mining work for years.

J. Shanahan and his associates on the Hopkins property on Mount Sheridan have just sent down a jack train load of ore. This is sacked and after the jacks reach the wagon road at the head of Iowa gulch it is transferred to wagons and taken to the smelter. The same lessees shipped a quantity of ore last year, but claim that the major portion of it was stolen somewhere in transit to the smelter.

The East Lake Mining Company, operating an extensive group of claims on East Lake creek owned by Leadville parties, among whom is J. E. Miller, is rapidly pushing development in the tunnel. This is equipped with a fine plant of modern machinery and the breast of the bore is 1,100 feet from daylight.

The increase in the price of coal will naturally be felt among the mines of the district. In certain of the sections, notably Iowa gulch and Rock hill, the difficulty is being solved by the use of electric power, and its superiority over steam is being demonstrated in many different ways.

Coal costs $8.50 to $9.00 in Iowa gulch, so that the dead timber of that section is being utilized to good advantage by some of the places where the electric plants are not being established.

A. A. Christiansen recently came in from Red Mountain where he has been prospecting and developing his claims. He brings with him several very fine specimens from his 1701 property. One is a block of steel galena weighing over fifty pounds which will run $125 per ton, and another piece of honeycomb quartz running $200 per ton.

Messrs. T. D. Kyle and associates, leasing on the Fanny Rawlings, are putting in an underground electric hoist for the purpose of sinking a winze to develop the lower contacts. In addition they are keeping up regular shipments of sulphides.

Speaking of the great Yak tunnel the Allis-Chalmers Company of Milwaukee, Wisconsin says:

"The Yak Mining, Milling and Tunnel Company owns and operates a tunnel over two and one-half miles in length, which is probably unique in equipment and the service to which it is put.

"The object in building this tunnel was to drain the various mines and mineral bodies tributary to its course. The Yak Company is itself engaged in working mines which open into the tunnel workings, and it also makes a business of hauling ores and waste for other mines tapped by the tunnel. All power operations are carried on by means of electric current except the compressors used in sinking shafts. This electrical energy is supplied in a complete power plant, with substations and transformer houses located in some cases under the ground.

"Mule haulage was used during the first stages of the tunnel construction; but, as the course grew longer, it was found that mule haulage was too slow and expensive, so that electric tramways were installed and have proven highly satisfactory.

After taking into consideration the extent of territory to be supplied from the power house it was decided that 6,300 volts alternating current would best answer the purpose. The general scheme was to transmit power at 6,600 volts to the various places where it is required and then to transform it to 400 volts for use in induction motors. This plan effects a considerable saving in the investment in copper, by the use of high voltage.

At the west end of the power house is located a 6,600 volt, 60 cycle 425 K. W. Allis-Chalmers revolving field generator direct coupled to a 600-horse power Allis-Chalmers Corliss Cross compound condensing engine. The condenser has a capacity of 10,000 pounds of steam per hour. Drainage water from the tunnel is used for cooling purposes and feed water is obtained from a reservoir several miles away in the mountains. The water is pure snow water and for that reason free from scale.

"Because of the case of transmitting electrical energy to the working faces of the mines and tunnels, the company has lately adopted the policy of using small motor driven air compressors to supply the drills. This plan avoids the necessity of long pipe lines, with the attendant losses, and gives a more flexible and efficient system."

OURAY COUNTY.

The mines of this county are booming away in good shape. The Camp Bird, Revenue, Atlas and a dozen others in the Sneffels district are outputting and shipping steadily and with satisfactory results. Mount Sneffels has produced on its Ouray and San Miguel slopes more than $100,000,000 worth of mineral wealth, chiefly gold and silver.

It is a massive upheaval and an inexhaustible formation of the precious and base metals. Its head towers over 14,000 feet above sea level and its vast possibilities are yet to be developed. All these tall mountains are simply nature's treasure vaults of this part of the spinal column of the American continent.

Around the sources of the Rio Grande, the Animas, the Uncompahgre, San Miguel, Dolores and minor tributaries everlasting deposits of mineral wealth abound, and the geologist and practical miner are just beginning to comprehend these facts. Long tunnels are cutting the ore bodies at depths varying from 500 to 3,000 feet, and scores of them have reached distances of one to four miles in length. Day and night these developments are be-

ing pushed, and already daylight is streaming through some of them from both slopes of the mountain. These long and deep tunnels are the true theory of mining development in this precipitous region.

A recent dispatch from Ouray states that a dozen years ago mining men who carefully-observed the ore zones of Mount Hayden predicted that the right party would eventually get hold of the Lloyd claim and other properties there and make great mines out of them. These properties are near neighbors to the famous Camp Bird and Edward J. Weatherly of London, England, proposes to make another Camp Bird on Mount Hayden. He has been hammering away there for two or three years and is now about to conclude a deal with a wealthy English syndicate through Messrs. Kling and Count Hamilton, both Swedish capitalists and men of high standing in the business world.

The group is north of the Camp Bird mills and consists of six claims, located for a distance of 8,000 feet along an immense quartz lead that varies in width from six to sixty feet, the entire vein carrying free gold values of better than $18 to the ton. Running parallel almost with the lead, but separated by a highly mineralized porphyry dike, is a silver-lead vein carrying very high values in silver, so that practically two leads traverse the trend of the holdings. In tunnelling on the main lead foot for foot is gained in depth, and when a point is reached beneath the apex of the mountain, between 3,000 and 4,000 feet of stoping ground will be above the tunnel level.

The property has been worked off and on during late years by leasers. In exploring the lead so far some rich tellurium ore shoots have been encountered. A force of men are now at work driving the main tunnel to explore the lead for 2,000 feet further, where a mill will be erected to treat the output. An ideal mill site on the creek below the portal of the tunnel can be made easy of connection by tram, and with plenty of timber nearby and abundance of water power that can be made easily available for operating purposes, the proposition all round is an ideal one for the making of a big producing mine.

The Herald says the strike in the Chipeta tunnel continues to hold out and has proven to be one of the best made in the camp this season. The assays run in the neighborhood of thirty-five ounces gold per ton with something above thirty ounces in silver. Mr. Bunce says that the strike was a kind of expected surprise. He started work on the tunnel about one year ago, and anticipated getting into good ore within eighteen months from that time. The strike was made before he really expected it, yet it was not a surprise. An ore house has been constructed and preparation made for handling the ore, a shipment of which will be made shortly. The character of the ore is carbonate, identical with that first discovered on the American Nettie, from which about $5,000,000 was taken and which is now producing good ore under lease. It will be remembered that Mr. Bunce gained a knowledge of the Gold Belt country when he was employed on the American Nettie and the O. & N. mine which joins it. He conceived the idea of opening up the quartzite stratum beyond where it was worked in the other properties and on the other side of the fault which passes through the hill.

In August a year ago work was started and on October 9th the machine drills were started. During the sixty-one days from October 9th to December 9th, the 8x8 tunnel was driven 641 feet and this rate was practically kept up until the 1,875 foot tunnel was completed in March, the total cost averaging a little more than $11 per foot. The rapidity with which the tunnel was driven caused considerable comment at he time.

During the first two weeks of December, 159½ feet were driven. A raise was made after the tunnel was completed and drifts made on veins which were cut, but the ore was encountered about 300 feet from the upper terminus of the raise by a tunnel driven in the quartzite. The strike made at this time is very gratifying to Mr. Bunce though he expects better things as the work proceeds in the way aroused in the Gold Belt section by this strike, which shows that the ore is still to be found in that section.

The first carload of concentrates turned out by the new mill on the Grizzly Bear-Union mine was shipped out Wednesday and proves to be a remarkably good product, running about $100 to the ton in gold, silver and copper. The mill has only been in operation a couple of weeks and during that time there were frequent shut downs for the purpose of making adjustments. At present the mill is operating satisfactorily and is demonstrating the value of these two properties, which heretofore have produced hundreds of thousands in values, though they have operated on a shipping basis. The success of this mill has aroused interest in putting other mills in the Bear Creek district and this will be done in the near future.

The Red Mountain Railroad Mining and Smelting company are getting their property in excellent condition for operation through the Joker tunnel. The tunnel is at present being driven to cut one of the ore shoots of the Genessee at great depth, in the neighborhood of 900 feet below the surface. This is really a cross cut from the main Joker tunnel and after it reaches the shoot for which they are driving, the main tunnel will be driven ahead to cut the Genessee below the main shaft, where there is a known body of high grade ore. This will enable them to drive the main tunnel of the Genessee ahead, as it will unwater the property, and allow the ore to be taken from the Genessee tunnel level. Another force of men are employed on the Yankee Girl, where an immense body of milling ore has been prospected for several hundred feet. In the milling ore are streaks of high grade which indicate that they will get a body of the high grade that made the Red Mountain country famous a number of years ago. After the Genessee and Yankee Girl have been opened up the company will turn its attention to the Guston and open it up in a systematic way. The various properties when the present plan of development is completed will afford more than twenty different places where forces of men may be employed at taking out high grade ore. The management is well pleased with the outlook and is confident that before long all the properties of the group will be working, the ore being taken out through the Joker tunnel which is provided with trolley cars and double track.

On the Telluride side of the Meldrum tunnel a remarkably large body of good pay ore is discovered, it is said, from seven and one-half to nine and one-half feet wide. The ore is being opened to a depth of 1,500 feet. Other good veins have been cross-cut in the tunnel which show good ore but this is said to be a veritable quarry of it. The Meldrum tunnel is designed to perentrate the mountain from the San Miguel to the Red Mountain creek on this side of the mountain. On the Telluride side it is in a distance of 2,800 feet and on the Ouray side about 1,500. If extended as contemplated, and it is believed now that it will be, it will cut some of the richest veins in the San Juan country at great depth.

At the Nightingale mine a good strike of rich silver ore is reported. The property lies on Engineer mountain and the vein is presumed to be an extension of the Frank Hough vein. The ore body has been opened up to the extent that the owners may start shipping at any time. W. J. Hill, W. S. McCarthy, et al., are the owners.

A peculiar condition exists in the National Bell property, which is being operated by the Blue Bell Mining Com-

pany under the management of George Crawford. The water which runs out of the tunnel is heavily impregnated with copper and it is found that where the T-rails have been in the water for some time the iron is replaced with copper. The same is true of all the iron with which the water comes in contact. The water is now being leased by parties and a series of tanks have been provided to run the water through. The tanks are provided with various pieces of scrap iron and it is said that it soon becomes replaced with copper in practically a pure state.

The raise from the contact level to the level above on the Newsboy has been completed and the ore shoot has been demonstrated to continue fifty-three feet from where it was encountered in the raise to the upper level. The ore is of good shipping value and is now in condition for mining. Work on this ore shoot and on another discovered in the contact level will be continued under the direction of Joseph Tumback who has a bond and lease on the property. From the present showing the fact is assured that the Newsboy will at once join the list of regular shippers to which it belonged a number of years ago. The two cars of ore shipped recently netted $500 per car.

PARK COUNTY.

G. W. Yount, who is mining in Hall's gulch, eight or nine miles beyond Webster in Park county, was in the city a short time ago and gave Mines and Mining some pointers about that part of the state. He says William Beamond, Nicholas Tomeo and Charles Strickler, who are working as partners in the Copper King, have made a bonanza strike. This property, which had been abandoned for 25 years, they took under a lease last May. It had been penetrated by a tunnel of considerable length, but the timbers had rotted and much rock debris had fallen in that time. The cleaning out of this debris and the retimbering consumed most of the summer. This accomplished, they commenced work at the heading, drove three feet to the right and at once struck into a large body of copper gold ore which runs $65 per ton, carrying seventeen per cent. red metal. They will continue the work of breaking mineral until sufficient has been accumulated to fill the 200 ore sacks they have purchased, when it will be shipped to the Argo smelter. Then, being unprovided with suitable winter quarters, they will lay off until next spring, when they will prepare for a long stay in the splendid mine they have partly developed.

The McDonald brothers, near by, have been mining all summer and have taken out a lot of ore, but no shipments have been made as yet. They will probably remain in their camp throughout the winter, as they also tackled one of the old long-deserted propositions of that region and in a short time "struck it rich." Mr. Yount is working at a point nine miles from Webster and one-half a mile from Beaumont and associates. He thinks he has an excellent property, but the workings have, by long neglect, caved in. Some assessment work has been performed on various mines in the district since last spring. Mr. Yount considers the Hall Valley section one of the best mining divisions in Park county, but for some reason it has been shunned by prospectors and miners until it seems to be hoodooed.

The older camps about Fairplay, Alma, Buckskin gulch, the great London mine and other points are not very noisy, but they are making the dirt fly all the same. The mines on Mounts Bross and Lincoln are doing better this season than for any similar time in the last dozen years. A score of rich strikes have been made in the older camps, and a number of new properties have rounded into form and become shippers. The London mine, in the hands of enterprising leasers, is making a lot of money for its operators. There is no reason, but a lack of capital, new blood and enterprise, why the Park county mines should not be as active and productive as they were thirty years ago, when the great Moose mine and others were turning out tons of gold and silver. Of course the palmy days of placer mining in Park county are gone forever, but the great lodes are there as of old, and they invite capital, mining ability and conservative operation. Park county is in the great mineral zone with Teller, Chaffee, Lake, Custer, Clear Creek, Gilpin and Boulder counties on the eastern slope of the continental divide, and like them, its mineral deposits are unlimited. Men of great ability are just beginning to comprehend the possibilities of these latent mineral resources.

ROUTT COUNTY.

General Frank D. Baldwin of Denver, who recently returned from Routt county, is enthusiastic over the outlook of that part of the state. While there he looked over the Little Snake river canal project and as a result took an interest in this enterprise and also invested in some coal lands.

"I cannot add anything to what has been said about Routt county and its wonderful possibilities," said the general this morning. "But I can confirm what Mr. Moffat and others have said, that it is the greatest empire of developed and undeveloped resources in the United States. Within its area there seems to be combined everything to make a great and prosperous country.

"Much of the credit of bringing this to the attention of the world is due to Mr. Moffat. As a result of the construction of his road, the Union Pacific and Rio Grande will also build into the county, and, with the connection west over the Moffat road, to be built by Jesse Knight and his associates, the county will be well supplied with railroad facilities and I predict that all this will come about within the next two years.

"This will be of vast importance to Denver, because all of these lines will undoubtedly eventually make traffic arrangements which will enable them to use the Moffat road and tunnel into Denver, thus putting this city on the main line for freight and passenger business for all the territory touched by these systems and their connections."

General Baldwin went over the railroad to Rifle and from there took a team to Meeker, where he was met with a four-horse army outfit and driver sent over from Fort Duchesne, Utah. From Meeker he drove to Lay, Maybell, Craig and Hayden, and up the Little Snake river valley to Baggs, where he spent several days investigating the district just being opened by the state to settlement under the Carey act.

At Baggs he was the guest of M. L. Allison, manager of the Routt County Development Company, which is building the canal system to irrigate these lands.

General Baldwin drove nearly 300 miles on his trip and looks as brown and tanned as if he had been on a month's campaign against the Indians.

The Routt County Courier states that two prospectors from the Douglas Mountain country coming into Craig report some excellent discoveries in that district. O. P. and J. E. Pierson, old Cripple Creek miners, have been developing their claims on Douglas mountain for the past two months. They have nine locations there and on the one where the principal work has been done they have uncovered a large body of copper ore that will average $150 per ton. They are preparing to ship this ore to Denver, although they will have to haul it overland a distance of 100 miles to Rifle, the nearest railway point. Before development ceases for the winter they expect to send out a couple of carloads. In the spring better machinery will be installed and mining

the ore commenced in earnest. Large chunks of ore have been taken from this mine that contain so much native metal it has been found impossible to break them with sledges. Some of these will run 50 to 70 per cent. The mineral does not contain even a trace of gold or silver. It may be stated in passing that the greater part of the population over there is in a jubilant frame of mind over the advent of the Moffat railroad, now that the steel rails have been laid through Gore canon.

EAGLE COUNTY.

Dispatches from Gilman, Eagle county, state that Manager S. N. Hicks of the Iron Mask mine, has resumed work on the property. C. H. Hanington of Denver, has been appointed superintendent, and Alfred Casco of Leadville, foreman. Quite a force has been put at work and shipments will be resumed as soon as the Rio Grande Railway Company furnishes the cars. Mr. Hicks has been assured by the proper authorities that cars will be provided, and if so, the output from the Iron Mask will reache 150 tons per day as soon as the ore bodies can be opened.

These are already blocked out and the ore is in sight. Both zinc and iron ores will be handled. The former will go to Leadville and the latter to Pueblo. Satisfactory contracts have been made and the prospects are that this large property will now be worked continuously, furnishing employment to a large force of miners.

MEXICO

Sonora, Arizpe—A mining proposition of importance in the Arizpe district is the Arizpe Mining Company, located forty miles south of Cananea and twelve miles north of Arizpe, capital of the district. The ledge on this property is from eight to sixty feet wide. The average produce is about twelve per cent. copper and fifteen ounces of silver. When completed the railroad will be only a few miles away. The property is in the big copper belt, with plenty of wood and water. Their shaft is down now 350 feet in ore, but neither wall has been struck. The concern has a big deposit of ore.

The gentlemen connected with this mine are a "gringo" outfit in the main hailing from the capital city of Hermasello. Dr. S. A. Williams is president and H. J. Smith, cashier of the Bank of Sonora, is secretary and treasurer. Incidentally it may not be out of place to say that the Bank of Sonora is one of the largest and strongest in the Mexican republic. Recently the bank shipped more than half a million dollars in silver to England, and now has on hand many tons of the white metal piled up in its vaults. The other members of this company are men of strong financial standing and high repute. The mine will be a success.

Sonora, Mexico (Llano Copper Company), Magdalena District—Mr. L. H. Jansen is one of the best known and skillful mining engineers in the Southwest; and he is luckier than many of his class in having strong financial backing. Mr. Jansen is president of the Llano Copper Company, located in the Magdalena district of Sonora, about thirteen miles southeast of Llano and three and one-half miles from the Southern Pacific railroad. The property of this company is an excellent one in a highly mineralized section. A shaft is down now something over 210 feet, with about 2,000 feet of underground work done. The ledge is seven and one-half feet wide and grows wider as depth is attained. The product is from eight to twelve per cent. copper, $6 gold and about the same of silver. A carload of new machinery is on the ground and more will soon follow. The management of the mine will ultimately sink their main shaft to the 1,000-foot level and thoroughly explore their ground. They own 1,100 acres of mineral land and have recently acquired the surface rights of 12,500 acres more. Their titles are clear and come direct from the government.

Recently Mr. I. E. Bowers, for many years connected with the Colorado-Crestone mine of Mienas Prietus, Sonora, has been engaged as superintendent. Mr. Bowers has a splendid reputation as a thoroughly competent mining man and the company is to be congratulated in obtaining his services. The directorate of the company in the main hail from Kansas City and are men of high standing.

The Llano Copper Company has every facility, including plenty of ore, to make and maintain a first-class dividend paying mine.

SOUTH DAKOTA

From the South African Mines, a journal published in Johannesburg, we compile the following statement concerning the gold output of that great gold producing country:

"In the first seven months of the current year the Transvaal has produced gold worth over fifteen and a half millons sterling. The exact figures are 3,671,443 fine ounces, valued at £15,595,303. For the first seven months of last year the output was 3,148,242 ounces, or in value £13,372,882, so that by contrasting the two periods we find that the 1907 returns exhibit an advance of 523,201 ounces, or £2,322,421. The increase may be viewed in a different manner—that is by comparing the average monthly output of the two periods, and we then have: 1906, average 449,749 ounces, or £1,910,110; 1907, average 524,492 ounces, or £2,227,900. The average monthly increase is thus 74,743 ounces, or £317,790. The total output of the Colony for 1906 was 5,786,617 ounces, or £24,579,987, or an average of somewhat over £2,000,000 per month. It will be recollected that the returns of the last few months of the year were considerably augmented by the declaration of gold previously held in reserve by several of the groups.

£26,735,000 Anticipated for the Year.

"Basing our calculations on the figures above advanced, it appears that the Transvaal's output for the current year will approximate to 6,290,000 fine ounces, and will be worth about £26,735,000. The May and June results were affected a little by the strike, and this, combined with the fact that of the five remaining months of the year three are long months, would lead one to expect a greater average for the succeeding months of the year than for those which have passed. On the other hand, the government's repatriation policy must not be overlooked, and we prefer to be on the safe side and accordingly estimate the gold production for the current year at about twenty-six and three-quarter millions sterling, or about £2,200,000 more than that returned during 1906. The 1905 output, we may remark, was worth £20,802,074, that of 1904 £16,054,809 and that of 1903 £12,589,248."

WYOMING

From Guernsey come reports that a Pittsburg corporation is negotiating for a tract of mineral land near there and if the deal goes through will establish ore reduction works and operate on a large scale. Over $700,000 will be spent in the mill and mine development. William C. Young and William M. Kerin, both of Denver, are interested in the deal.

A recent dispatch from Cheyenne states that J. W. Boyd general manager of the Sherman Copper Mining Company, a corporation composed of Colorado mining men, is in the city today having returned last night from the company's holdings with State Geologist H. C. Beeler. Yesterday Professor Beeler made an examination of the property, upon which much development work has been done, and will

make a formal report thereon which will be included in his annual report to the governor. The workings of the company are about two and one-half miles south of Sherman, in Albany county. The mineral showing is highly satisfactory, and a contract has just been let to a Colorado mining contractor to sink 300 feet further into the mountain.

This company it is understood has ample capital with which to carry out its plans and the work will be pushed without delay.

The Interior Department asked the Department of Justice to bring suit against the Union Pacific Railroad Company for the recovery of 4,700 acres of coal land, which the government claims the road practically stole in Horse Thief canyon in Wyoming. The Union Pacific bought the land claiming it was only agricultural land, when it knew absolutely, so the government claims, that it was rich in coal.

Walton—Eastern capitalists under the direction of Col. Hirtz, and expert La Viers, have been looking over the copper prospects located by Dan Tracy in the Rattlesnake mountains. If reports from there are reliable, the outlook is brighter than at Copper mountain.

The main lead has been found, and specimens show very rich deposit. The vein is six feet wide at the surface, and of unknown depth, and all indications point to the fact that the deposit is very rich. F. E. Le Mars of Riverton, who has just returned from the mountains, and who is a prospector of long experience states that he would not take $200,000 for the claims at the present time. A deal is reported to have been consummated by which forty-nine per cent. of the property is to be purchased by eastern capital at a price of $125,000, and that ore will begin to move for shipment within a very short time.

OBITUARY

Hollis Hall, youngest brother of C. L. Hall, editor of Mines and Mining died from the effects of injuries received during the fire that destroyed his residence in Minnesota a few days ago. He had a valuable home, was comfortably situated and nearly sixty years of age. He leave four brothers, two sisters and a score of minor relatives to mourn his untimely taking off. The particulars of the accident have not yet reached us.

D. Willis James, senior member of the firm of Phelps, Dodge & Co., and actively interested in a large number of copper concerns, died September 13th at the Mount Washington hotel, Bretton Woods, New Hampshire, of heart disease. He was born in Liverpool, England, and was about seventy-five years of age. Aside from his prominence in the New York metal market, Mr. James was widely known as a philanthropist, having given largely for the advancement of art and education. He was a member of many clubs, of the American Geographical association, the American Museum of Natural History Association and the National Academy of Design. He had been in business in New York for more than a third of a century.

Frank Gallotti, an old timer, and highly respected citizen of Durango, Colorado, died in that city a few days ago at the age of sixty-three years. He was born in Pania, near Turin, Italy, and settled in Durango early in 1881. In the intervening years he has been extensively engaged in the real estate and insurance business. In all his business and social relations he was strictly honorable and had a wide circle of friends. His health had been failing for the past eighteen months, and he finally succumbed to a complication of heart trouble and pneumonia. He leaves a devoted wife, but there are no children and most of the relatives are in Italy. He was an honored member of both the Masonic and Woodmen of the World orders, and he carried life policies aggregating $8,000 which amount will go to Mrs. Gallotti. She is a competent lady and will continue Mr. Gallotti's business.

Robert Porteus, a pioneer mining man of Ouray, died at his home in that city last week of heart failure following an illness of two weeks. He was a native of Scotland, born sixty-five years ago, and came to the United States at the age of seventeen years, and to Ouray in 1875. He had made and lost money in mining and at his death was one of the principal owners of the Lloyd group of claims, near the noted Camp Bird, upon which a deal was pending to a wealthy English syndicate who had taken charge of the property under bond and lease. He had no relatives in this country, but an only daughter residing in Chicago. The Herald in speaking of his earlier life say: "Robert Porteus, a pioneer coming into this country among those who came earliest, was a man possessing those sterling qualities which made possible the settlement and development of a wild and rugged country. It is through the influence of such men that the state of Colorado has been built up, and the mountainous section of southwestern Colorado was not the least difficult of settlement. Many successful men in the state may trace the beginning of their success to Robert Porteus and those who were associated with him in the early days. He had his faults like other men but his good traits will be remembered by his many friends and especially the pioneers of the '70s in whose rapidly fading ranks another vacancy occurred when 'Bob' Porteus passed over the range."

BOULDER UNIVERSITY NOTES.

The large classes in chemistry at the State University have necessitated the appointment of an instructor to relieve Prof. J. B. Ekeley and his assistants. Mr. Arthur L. Tatum has been called to the position. He is a graduate of Penn College, Iowa, and a Master of Arts from the State University of Iowa. With his assistance the efficiency of the chemistry department should be greatly enhanced.

Gold, silver, and other precious metals will be more thoroughly studied than hitherto at the University of Colorado. A new course has been offered to the geology students entitled Mineralogy and Assaying. This will be directed especially with regard to metals and for it an assaying furnace has been particularly erected. In such a mining state as Colorado, the study of advanced mineralogy is of great importance to the geological student, yet but few technical institutions offer such advantages throughout the United States on account of the lack of equipment. Prof. Russell George of the department, also state geologist, will personally superintend the class which will be open only to those who have accomplished considerable work in the general and special courses in geology.

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THE STOCK AND METAL MARKETS

Colorado Springs

October 2.—The exchange opened the week today more active than in the past several weeks. Acacia was higher at 7¾ and Elton at 50⅞. Fanny Rawlings advanced to 6½, with Gold Soverign and Isabella stronger. Portland gained to $1.13, three cents over last week's closing price. On Tuesday Isabella advanced to 22¼, with Portland closing at $1.12 bid. Wednesday, Portland declined to $1.08½, with Isabella lower at 21¼ bid. Following are the quotations:

Mines.

Stocks	Bid
Acacia	07¾
C. C. Con	04¼
C. K. & N.	05
Dante	04½
Doctor Jack Pot	06⅛
Elkton	49
El Paso	37
Fanny Rawlings	05
Findley	38
Gold Dollar	06½
Gold Sovereign	3⅞
Index	02
Isabella	21½
Jack Pot	04¼
Last Dollar	02
Lexington	02⅜
Mollie Gibson	02¼
Moon Anchor	02½
Old Gold	03½
Pharmacist	03¼
Portland	105
Vindicator	78
Work	15¾

Unlisted.

Stocks	Bid
Golden Cycle	40
Jennie Sample	04
Jerry Johnson	05
United Gold Mines	05¼

Prospects.

Stocks	Bid
American Con	0075
Banner	01⅛
Bob Lee	009
Buckhorn	0075
C. C. & M.	007
Des Moines	008
Gould	01¾
Ida May	02¼
Jolly Jane	008
Keystone	01⅛
Little Nell	0075
Little Puck	01⅛
Mary Nevin	02
New Haven	01
Pilgrim	01
Raven	009
Republic	0095
Requa Savage	02⅞
Rose Maud	02
Rose Nicol	01
St. Thomas	01¼
Teutonis	01¼

Miscellaneous.

Stocks	Bid
Anchor	002
Black Belle	001
Blanche	003
Cable	005
Easter Bell	002
Flower of the W.	007
Gold Hill	002
Grace	002
Hayden	003
Key West	001
Kitty	002
Lucrative	0025
Matoa	005
Montreal	005
Nellie V.	003
O. K.	004
Olive Branch	003
Progress	002
Pythias	001
Red Spruce	002
Tenderfoot	0035
Texas Girl	004
Uncle Sam	0035
Volcano	002
Wide Awake	001

Denver

Oct. 4.—Folowing are the sales and quotations on the Denver stock exchange today:

Stocks	Bid
C. C. Con.	4¼
Dante	4⅝
Gold Sov.	3¼
Old Gold	3¾
Isabella	23⅛
Work	15¾
Jerry J.	5¼
U. G. M.	5½
Rav. & B. H.	1
National	9.00
Republic	8.50

New York

October 3.—The Camp Bird report for fiscal year to April 30th shows a profit of $450,040. This result was achieved with the mill running only six months of the year. For depreciation of plant $34,100 is set aside, this amount being ten per cent of the estimated value of the plant. The reports of the engineer and general manager show that after treating 38,295 tons of dry ore between November 1, 1906, and April 30, 1907, the reserves on April 30th were 112,000 net tons broken in the stopes and 89,000 net tons blocked out, making a total of 201,000 tons of wet ore in reserve which it is estimated will yield a profit of $3,500,000.

The United Metals Selling Company and other large producers continue to quote copper at 15 cents a pound although sales are reported a shade below that price. No large transactions have been made. The big consumers are still holding aloof from the market, and signify their intention of remaining out until they feel that the bottom has been reached.

A large producing company says that in view of the fact that cost of production is now within a few cents of the selling price, a further heavy recession in prices would be unnatural.

Copper producers are expecting an early announcement from the officials of the Calumet & Hecla of a plan to reduce the output of the mines of the company. It is stated that the Calumet & Hecla is not likely to lay off any large percentage of its men but on the other hand wil cut down the working hours.

If no buying of copper develops within the next two weeks it is estimated that the Amalgamated mines before the expiration of that period will be producing not more than thirty-five per cent. of their normal output of copper.

Additional small sales of copper on a basis of 15 cents for electrolytic have been reported. No large contracts have been closed, but it is expected that the large consumers will enter the market within the next week or two. It is not expected that they will take copper in large quantities until they are assured that the bottom, so far as prices are concerned has been reached.

The copper situation shows little change from Monday, although it is reported in the trade that several of the large consumers are making inquiries which may develop into orders in the near future.

The subsidiary companies of the Amalgamated Copper Company are producing between thirty-five and forty per cent. of the normal output. A week or so ago they were producing about forty per cent. of the normal output. If the tendency of the copper business continues on the decline a further curtailment will be ordered.

The cost of production of the subsidiary companies, as a result of the falling off in output, is now running within a few cent of the present quotations of copper. It is authoritatively stated that cost of production is now running between 12 and 13 cents a pound. In this connection it is said

that certain companies are producing copper almost at a loss. The position of the copper companies is likened to that of the steel companies in the face of decreased production. That is, reduced output is always accompanied by an increase in operating cost.

Following are the quotations:

	Close
Amalgamated copper	57⅞
American Smelter	87⅞
American Smelter pfd	96¼
Colo. Fuel & Iron	18¾
Anaconda Copper	89

Curb quotations:

*Stocks—	Bid
Arizona Commercial	12
American Saginaw	..
British Col Copper	5¾
Black Mountain	5
Cumberland Ely	6½
Davis-Daly	7½
Ely Cons. Copper	⅝
Eagle	1⅞
East Butte	5½
Foster	63
Giroux	4¾
Greene Cananea Copper	8¼
Green Gold-Silver	¾
Hancock	7
King Edward	⅝
Keweenaw	5½
Mitchell	1¼
Nevada Utah	3
Nevada Cons.	9½
Nipissing	6⅝
Superior & Pittsburg	9¾
Tintic	3¾
Utah Apex	3¼
Newhouse	7⅞
Carisa	35
Ely Giroux	1
Dom. Cop.	2⅝
Mont. Sho.	5½
Empire	1½
B. & L.	⅞

*Otis & Hough.

Boston

Oct. 3.—There will be by December 1st in operation right on the ground a mill for the treatment of the ores of the Lexington mine, owned and operated by the La France Copper Company.

Heretofore the Lexington has been shipping 150 tons of ore daily to the Washoe smelter, but, under that company's decision to cease for the present handling any more custom ore, shipments to that plant have been discontinued.

Mining operations, however, will not cease. In the big veins the ore is being mined and stacked, but not shipped. The Lexington mine has been, it is stated, unwatered after three years' work.

A prominent New England manufacturer says:

"Investors in electrical companies should keep their eyes on the Allis-Chalmers Company. That company, in my opinion, is now going through what the General Electric Company went through a few years ago.

"The Allis-Chalmers Company commands excellent manufacturing talent in its employ, and has a business in mining machinery outside of its electrical business, which is extremely profitable. Its plants are second to none in the country and it is expanding in the electrical field to a remarkable extent.

"It has been this expansion that has caused the company to be temporarily pinched for new money but this financial condition has already been improved. I believe that the Allis-Chalmers Company will be a growing factor in the electrical trade."

A mining engineer who has just examined the property of the East Butte Mining Company, reports:

The cost of construction, amount of underground development work done since the East Butte company took possession of the property, and the quantity of ore blocked out in the East Butte company's mines, follow:

Cost of construction	$46,052
Underground development, feet	11,905
Ore blocked out, feet	5,974,040

Crosscutting on the East Butte property has been done to a limited degree below the 400-foot level, and a number of ore veins have been cut showing relatively the same value as above.

Captain C. H. Palmer, general manager of the Davis-Daly company, was in Boston Friday. He says: "We have made no reduction in our working forces, except perhaps in the Original crosscut, where we have been forced temporarily to stop work because of the machinists' strike. Most of our underground work is on contract, which we find the most economical method of development.

"We had three important veins in the Original crosscut before we stopped work. The last one was our best, and it was thirty-five feet wide and contained streaks of very rich ore. The whole vein was well mineralized. We think this is the Smokehouse vein, but are not sure."

Following are the quotations:

Stocks	Bid
Adventure	1½
Arcadian	4
Allouez	28
Atlantic	9
Bingham	8
Boston Con.	14½
Balaklala	5
Butte Coalition	15⅜
Calumet & Arizona	107
Copper Range	57
Daly-West	10
Franklin	8¾
Granby	87
Isle Royale	15
La Salle	10¼
Mohawk	50
North Butte	47
Osceola	78
Quincy	78
Shannon	10¼
Tamarack	65
Trinity	6 13
United Copper	47
U. S. Smelting	34
U. S. Smelting pfd.	35½
Utah Cons.	34
Victoria	4½
Winona	4¾
Wyandot	75
Wolverine	109

*Otis & Hough.

Ne ad !

San Francisco, Cal.—Closing quotations on the Mining Exchange October 3d):

(Received over private wire of O. L. Malo & Co., 221-22 Boston Block, Denver.)

Tonopah.

Stock.	Bid.
Tonopah-Nevada	$10.00
Montana Tonopah	1.95
Tonopah Extension	1.40
MacNamara	25
Midway	70
Tonopah Belmont	1.95
Tonopah North Star	13
Ohio Tonopah	2
West End Cons.	60
Rescue	6
Golden Anchor	8
Jim Butler	58
Cash Boy	3
Home	4
Boston Tonopah	3
Monarch Pittsburg Ext.	5
Montana Milday Ext.	3
Golden Crown	5

Goldfield.

Stock.	Bid.
Sandstorm	26
Red Top	2.75
Mohawk	17.00
Columbia Mtn.	21
Jumbo	2.75
Jumbo Ext.	1.35
Vernal	15
Pennsylvania	1
Kendall	22
Booth	25
Blue Bull	21
Adams	8
Silver Pick	35
May Queen	9
Nevada Boy	5
Black Butte Ext.	4
Blue Bell	11
Dixie	4

Goldfield Columbia	30
Hibernia	4
St. Ives	46
Lone Star	13
Patlatch	30
Oro	13
Mayne	4
Atlanta	27
Great Bend	38
Simmerone	8
Empire	8
Red Top Ext.	15
Florence	3.50
Diamond B. B. Cons.	15
Goldfield Daisy	92
Laguna	1.15
Commonwealth	23
Combination Fraction	1.25
Great Bend Ext.	10
Great Bend Annex	10
Milltown	....
Black Butte Bonanza	3
Kewanos	32
Esmeralda	9
Portland	8
Crackerjack	11
Frances Mohawk	95
Red Hills	31
Mohawk Ext.	7
Lou Dillon	7
Yellow Tiger	17
Grandma	9
Silver Pick Ext.	5
Yellow Rose	5
Goldfield Cons.	6.80
Pittsburg Silver Peak	1.30
North Star Wonder	03
Eagles' Nest	40
Ruby Wonder	10
Alice of Wonder	3
Fort Red Rosa	....

Bullfrog.

Stock.	Bid.
Original	3
Bullfrog Mining	5
National Bank	11
Amethyst	14
Gold Bar	40
Denver Bullfrog Annex	2
Bonnie Clare	35
Mayflower Cons.	23
Montgomery-Shoshone Ext.	5
Montgomery Mtn.	8
Nugget	4
Tramp Cons.	20
Victor	3
North Star	4

Manhattan.

Stock.	Bid.
Manhattan Cons.	30
Manhattan Mining Co.	5
Gold Wedge	4
Seyler Humphrey	3
Dexter	3
Crescent	2
Combination	1
Granny	20
Original Manhattan	7
Broncho	6
Jumping Jack	12
Stray Dog	10
Indian Camp	6

Other Districts.

Stock.	Bid.
Fairview Silver King	10
Fairview Eagle	1.00
Nevada Hills	4.25

Metals

St. Louis, Oct. 3.—Lead—Dull, $4.50 @4.52½.

Spelter—Higher, $5.60.

New York, Oct. 3.—Lead quiet, $4.60 @4.75.

Lake copper weak, $14.50@15.00.

Silver, 66½c.

COPPER OUTLOOK.

New York.—A. H. Wethey, general manager for ex-Senator W. A. Clark's Montana enterprises, has just arrived from the West. Replying to questions as to conditions there, Mr. Wethey stated that he feared the Butte mines would be forced to close on account of lack of fuel and timber. He said the construction work being carried on by the Milwaukee and Northern Pacific Railroad around Butte already gave employment to 15,000 men, and more were needed, as a consequence it was impossible to get the necessary men to work in the woods, and if the copper mines in Butte were not shut down now they would be forced to do so very soon. The Western Lumber Company, a Clark concern needed several hundred men, but although they had tried in various parts of the country to get woodsmen they had been unsuccessful. Their stock of lumber was almost depleted and it seemed impossible to get the trees felled and logged to provide for the coming season's necessities. At Butte the machinists' strike still continued—every effort had been made to continue operations, but still several mines had been compelled to close. The machinery at the various mines was rapidly getting into bad condition and it would soon be necessary to close other properties.

At Jerome, Arizona, which Mr. Wethey visited on his way East, he found that the United Verde Copper Company had only a few days' supply of coke on hand. The Santa Fe Railroad was so crowded with traffic that they were refusing to receive coke. Of 25,000 tons of coke ordered for smelting plants in the southwest ninety days ago for immediate shipment, only about 1,200 tons had been shipped and the railroad company had refused to receive more until the present freight congestion was over. Along the line of the Santa Fe the country and crops never semed in a more favorable condition than at present.

PERSONALS

Philip K. Robertson is now superintendent of the La Palmilla mine at Parral, Mexico.

Walter E. Koch, M. E., of El Paso, Texas, is making examinations in Guerrero, Mexico.

John Glissan has been appointed superintendent of the Four Metals Mining Company.

J. G. Dailey, assayer, of Torreon, Coahuila, Mexico, is visiting various points in the United States.

Will C. Higgins of Salt Lake, Utah, has completed an examination of a mining property in the Dos Cobezas district, Arizona.

Arthur S. Dwight, mining engineer and metallurgist, 25 Broad street, New York, is making an extended visit in the west and southwest.

John Reigert has assumed the superintendency of the Crosby mine, the property of the Cleveland Cliffs Iron Company on the Gogebic range.

Etienne A. Ritter has been appointed manager of the Evergreen Gold & Copper Mines Company with properties in Gilpin county, Colorado.

Frederick Kruse of Ceneral City, Colorado, a recent graduate of the Columbia School of Mines has joined the engineering staff of the Goulds.

A. L. Pearse, M. E., of London England, with a number of English clients, is making examinations of mining properties in Utah and Nevada.

William Roberts, who has had charge of underground operations at the Regent mines at Negaunee, Michigan, has resigned and is now located at Butte, Montana.

George W. Maynard, consulting mining and metallurgical engineer of New York, who recently completed mine examinations in Alaska and in Idaho, visited in Spokane last week and is now on his way to Mexico.

Frederick R. Burnam, manager of the Mexican Western Development Company has returned to Guadalajara, Mexico, from a several months' visit in the United States.

Frank P. Swindler manager of the Heinze interests in the Tintic district, Utah, has returned to the properties from California, where he went on account of illness.

J. Allen Root has resigned as assayer for the Inde Gold Mining Company of Inde, Durango, Mexico, and accepted a similiar position at the Veta Colorado mine, at Parral, Mexico.

G. A. Anderson has resigned from the staff of the Cleveland-Cliffs Iron Company, and has accepted a position with the Commanche Copper Mining Company, Silver City, New Mexico.

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ALVARADO MINES.

Boston.—For years the Alvarado silver mines of Parral, Mexico, have been among the mining wonders of that country of rich mines. They are owned by a Mexican peon, Pedro Alvarado, who, however, expended his millions too freely, and although he has taken out between $15,000,000 and $18,000,000 worth of ore now finds himself in debt and forced to realize upon his only asset—his mines.

Joseph A. Coram of Boston has succeeded in leasing the property, and a first payment of $100,000 gold has already been made.

Mr. Coram leases it for 15 years and secures 55 per cent. of the net profits of the property, 45 per cent going to Mr. Alvarado. He pays $100,000 gold down and loans Mr. Alvarado $300,000 additional, which is to be paid back with 7 per cent. interest out of the Alvarado share of the profits.

Mr. Coram has organized a syndicate for $500,000 to finance the above lease, calling for the immediate payment of $400,000, and to provide $100,000 for the erection of a mill to treat the lower grade ores. Eighty per cent. of the amount has already been subscribed.

Frank C. Morehouse of the Mexican Consolidated Company has been placed in charge, and from now on these mines will be operated according to American standards of mining.

The property has only been mined to a depth of 600 feet, and is in shape to give immediate returns. Four American experts are now there.

Hereafter the Alvarado mines will be managed from Boston. Companies will soon be formed under Mexican and Maine laws to conduct their operations.

ANACONDA MEETING.

The directors of the Anaconda Copper Company were due to meet on last Tuesday of the current month, but owing to the fact that three members of the board, namely, H. H. Rogers, W. L. Bull and J. D. Ryan, are ill, and William Rockefeller will probably be away at that time, it is expected the meeting will be adjourned to October 1st.

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PERSONAL.

(Continued from page 26.)

Dr. David T. Day and B. F. Oliphant are in attendance as representatives of the United States at the International Petroleum Congress, which is being held in Roumania.

Edward S. Dickinson, M. E., a graduate of the Michigan College of Mines, has been appointed superintendent of the Florence Iron Company's mine on the Menominee range.

Murray Arnold Hines, Ph. D., of the Mallinckrodt Chemical Works of St. Louis Missouri has been appointed assistant professor of chemistry in Northwestern University, Evanston, Illinois.

J. J. Rutledge, M. E., of Baltimore, Maryland, recently completed an examination of a mining property in the Lake of the Woods district, Canada, and is now in Parral, Chihuahua, Mexico, on a similar mission.

J. W. Carey, of the machinery firm of Cary & Fielding of this city, left last week to spend some time on his large ranch in Routt county. Mr. Cary was accompanied by his wife and a number of their Denver friends will be among their guests for a time at the great ranch.

John Melton, one of the old timers and a well known business man of Silverton, is in the city with Mrs. Melton for the winter. They migrate up to the metropolis every fall and migrate back in the spring.

Clarence O. Finch, editor and proprietor of the Silverton Miner, has been in the city about ten days, getting out a finely illustrated edition of his paper. It will contain sixty-four pages, representing the principal mines and mills of San Juan county. As a work of art it will be hard to beat, and as a detailed representation of San Juan county's great industry—mining—it will surpass anything ever published in that part of the state.

SHORTY'S PRAYER.

Shorty Anderson, well known in certain mining circles some years ago, was given overmuch to drink. One night he was returning from camp to his shack about two miles away, considerably intoxicated, and fell into a prospect hole about twenty feet deep. His hands caught a timber and he held on for dear life; but while he was sobered by the effort he was making, he found that he could not hang on much longer, so he prayed to God for help, as he had already yelled his lungs almost out without avail. About this time he let go and fell six inches. "I considered it an imposition," said Shorty.

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(Continued from Page 29.)

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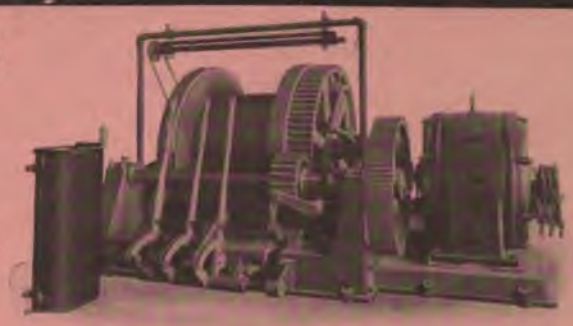

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WEEKLY

Vol. XV Denver, Colorado, October 18, 1907 No. 3

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Mexico

Our neighbor republic is undergoing great prosperity. Capital from this country is going into Mexican investments at the rate of $30,000,000 a year, including mining, smelting, railroads, agriculture, manufacturing and other industrial investments. They find it an inviting field for profitable returns. Labor troubles do not occur there, as that element is held in check by the strong arm of the government and agitators are not allowed to ply their vocation anywhere in the republic.

All the larger cities of Mexico have their American colonies and many of the smaller ones. Every mining district is ably represented by American labor, capital and enterprise. Mexico is rapidly becoming Americanized. A few years hence commercial reciprocity will be established by mutual consent of the two countries. Mexico has vast resources that invite development. But she is waking up to her possibilities, and two decades hence will see her wealth and population increased by fifty per cent. Education is planting its banners in every city, village and hamlet of the republic, and peace, prosperity and good government are lighting up the hitherto neglected and isolated places of that highly promising country.

Lost Historic Papers Found

Reports from Berkeley, California, state that the lost "Carondolet" papers which for more than a century have eluded the search of the historians of the world, have been found in the Bancroft Library of the State University, by Professor Henry Morse Stephens and F. J. Teggart, custodian of the library.

It will now be necessary to rewrite the history of the Southwest. The papers are the official documents of the Spanish rule of Louisiana and contain all the historic events of the period. The documents were lost while in transit to Spain.

Baron de Carondolet was the last Spanish governor of Louisiana. These manuscripts were obtained by M. Pinart, who was in the employ of Bancroft as collector in the West Indies. They were chiefly written during the last twenty years of the eighteenth century and upon them is based the most important facts of the early history of the Southwest. On learning of the discovery of these papers Professor Frederick J. Turner, one of the best known historians in the United States, said: "The discovery of these papers will make necessary the rewriting of the history of the Southwest."

Following Baron de Carondolet's term as governor he returned to Europe, and about that time his papers disappeared. The papers contain reports to the governor throwing light on the early history of western exploration. Besides the Carondolet papers there are among the Pinart manuscripts special collections relating to the Dutch West Indies, particularly the governmental records of the Dutch island of Curacao, to the Danish West Indies, including the letter book of one of the early governors of the year 1733, and particularly to the Spanish islands of Cuba and Porto Rico.

It will be many months, perhaps years, before this mass of manuscripts can be adequately calendared and made accessible to students, but the work has now begun and will sooner or later be carried to its completion.

Mining Schools

Prof. A. H. Purdue recently published a pamphlet on mining schools, from which we take the following extract:

"Each locality has its own peculiar mining problems, which will be quicker met and solved by engineering schools near at hand than by those distantly situated, for the reason that they are near and convenient and it will be to their interests to develop the mining industry of the locality. There are doubtless many deposits of economic worth lying idle, which need only the incentive that would come from a near-by mining school to make them paying property. There are others being worked by antiquated methods, eking out a precarious existence, that a little intelligent direction, coming from the influence of a school whose duty it is to look after the mining interests of the locality, would put on a paying basis.

"The elective system that prevails in practically all of our state universities permits those students who take their

degrees in other lines of engineering, to elect such courses in mining as their time and preparation will permit. At my own school though the courses in mining have been offered less than a year, certain ones of them have been elected by the best students in engineering. While such students cannot be sent out as mining engineers, the small knowledge of the subject thus acquired may prove of inestimable value to them and their employers in the future. Furthermore, we fully expect within the next few years, to discover several mining engineers by students in other engineering lines electing our courses. A large percentage of boys who enter college have engineering tendencies and enter the departments of civil, mechanical, and electrical engineering, having never heard of mining engineering. By electing courses in the latter many will find that it is more to their liking than the course taken up, and will make the change.

"The courses in mining engineering are the only ones offered in our schools that lay sufficient stress upon the estimation of the cost of work and plants. An immense building brings in profit from rent. A railroad bridge pays for itself and is a source of profit to the company because of the line it completes for ready transportation. But every dollar that is put into a mine for labor, material, or machinery, must come out of the mine, and enough in addition to pay a profit on the investment. This necessitates a most careful investigation into the probable size of the ore body, the cost of working it, the facilities for transportation, the cost of fuel, the cost of the plant, and the hundred other things that naturally suggest themselves to the cautious manager. Such a course of training is valuable not only for the mining engineer, but would be most valuable to students in other lines, especially in civil engineering.

"In no other field are intelligent business men so often imposed upon as in "wild-cat" mining schemes. Men with good business judgment in most things are often easily led into these "sucker traps." The general diffusion of mining knowledge that would come from a large number of good mining schools would do more than anything else to prevent the floating of these fake schemes.

"Many mining schools in close proximity would act as a stimulus for each other, just as the multiplication of universities has acted in the field of general education. We can well imagine the conservatism and air of self-satisfaction that would prevail in our universities if there were but a few of them. Would not the same conservatism, self-satisfaction, and non-progressiveness pervade our mining schools if they should remain but few in number? Under such conditions, would they not be teaching methods long ago discarded by the wide-awake, progressive miner in practical work? Sharp competition will keep us all abreast of the times."

Taking Samples

Some good suggestions have been made by Dr. Richard Beck* relative to the taking of samples by prospectors who have found an ore deposit and have done the first development work. The method of sampling described below is to furnish geologic description of the ore occurrence.

1. First of all, make a sketch of the occurrence, even though on the crudest topographic basis, denoting on it by figures the points from which the several samples were taken.

2. The corresponding numbers should be at once attached to the sample by means of labels, or, better yet, painted on with cinnabar color when this is possible. These figures are rendered still more indestructible by a varnish of ordinary shellac. The samples should be accompanied by cards bearing the same numbers, or by a corresponding list.

3. A cross-section, be it ever so simple, should always be added, and should be inscribed with the corresponding figures.

Next collect:

4. Samples of the undecomposed from the deep portion of the deposit; also of the decomposed outcrop.

5. Fresh country rock outcropping at some little distance, and perhaps also decomposed country rocky immediately adjoining the deposit from both the underlying and the overlying beds, in hand specimens and also in smaller fragments, suitable for chemical or microscopic examination.

6. The same from eruptive dikes or masses outcropping in the vicinity.

7. Fossils from the fossiliferous underlying and overlying strata, when such strata are present.

8. Samples of clayey, gougy and gravelly masses connected with the deposit, material to which assayers, too, should pay close attention, despite its apparent worthlessness (for instance, the argentiferous gouge of many occurrences.)

9. In the case of placers, both crude and washed or concentrated material, should be packed in sacks, and when possible, samples of each layer of the cross-section of the placer.

A small but well selected and labeled collection of this kind, remarks Dr. Beck, may be of greater scientific and perhaps also of more practical value than a large collection assembled without method and improperly labeled or packed.

Only when real mining is carried on will it finally be possible completely to satisfy scientific demands and to obtain larger samples, showing, if possible, both the structure of the occurrence and both selvages, together with the country rock.

*The Nature of Ore Deposits, vol. II, pp. 668-9.

Phosphate Mining in U. S.

Phosphate rock, the use of which is limited to the manufacture of mineral fertilizers and chemicals containing phosphoric acid, is found in many parts of the United States, but the deposits that furnish the principal commercial output are those of Florida, Tennessee, and South Carolina.

Of the 2,080,957 long tons* of phosphate marketed in the United States in 1906 (valued at $8,579,437,) Florida produced 1,304,505 tons, $5,585,578; Tennessee, 547,677 tons, $2,147,991, and South Carolina, 223,675 tons, $817,068. Other states, including Arkansas and Idaho, produced 5,100 tons, valued at $28,800.

The statistic of production collected by the United States Geological Survey in recent years indicate that the demand for the material has made more rapid strides than the output, and the tendency of the price per ton has been upward. Under these conditions of growing demand and higher prices it is therefore not improbable that many low grade deposits, which it has hitherto been impracticable to utilize, may be profitably worked.

A bed of blue phosphate rock recently discovered in western Putnam county, Tennessee, on the eastern flank of the Nashville dome, or on the side opposite the older phosphate fields, bids fair to be of commercial importance, and recent prospecting has discovered a number of workable deposits in Utah, Wyoming and Idaho.

In Idaho phosphate mining has been begun on a considerable scale in the vicinity of Montpelier, the mineral being shipped to Martinez, California. The Arkansas deposits are found along Lafferty creek, in western Independence county, and although worked at a single point, they extend for some distance in an east-west direction, reaching from Hickory valley, ten miles northeast of Batesville, westward to St. Joe, in Searcy county or beyond.

*Comparing the figures of phosphate rock production for 1906 just published by the United States Geological Survey.

Reinforced Concrete in Mining Operations

By Joseph H. Hart, Consulting Physicist.

There is no doubt that the ordinary mining engineer, while more or less familiar with his own particular subject, is considerably behind his colleagues in other fields in regard to general engineering applications and developments. This is undoubtedly due to the isolation of the average mining engineer, both on account of the location and the difficulties of obtaining literature in other fields. This condition of affairs results in a general lag in the application of many modern developments to mining operations.

On the other hand, when such developments are brought to the attention of the mining world, there is no class of people more eager to adopt any and all improvements, and none more open to a clear appreciation of the situation. This applies with particular force to concrete and reinforced concrete in their utilization in mining developments. The production of concrete has increased many fold within the last decade, and not only has the quality become superior, but methods and ease of installation are also improved and the cost is diminished almost in the same measure. Owing to these developments, concrete has been substituted, in many cases, where timber and brick and iron and steel were formerly used, with gratifying results both from an operating and first cost point of view.

The development of reinforced concrete alone has almost revolutionized many industries. Of course, the increased demand for the material is the basal cause of the large increase in output and of its superior quality and diminished cost. Concrete by itself, while possessing many advantages for building and other applications, was hopelessly at a disadvantage on account of one peculiar characteristic. Thus, while almost impervious to weather conditions and other causes of decay, and possessing the strength of iron against compressional stresses, it was unsuitable in many applications by reason of its weak tensile strength. Thus a concrete column will bear a weight almost that of a corresponding iron one, without crushing or buckling, if of the proper proportions; and, on the other hand, subjected to a pull it is extremely weak and is utterly useless for this purpose under any circumstances.

Reinforced concrete, as most people are aware, was invented to overcome, or at least modify, this particular characteristic of ordinary concrete. In brief, reinforced concrete consists in the substitution of an iron or steel bar at the place in a concrete column where a tension is inevitable to take the place of the concrete at this point and attend to this duty properly. Thus, in a girder subjected to a bending stress, it is considered by engineers that this column undergoes a compression along the top layer and a tension along the bottom. The concrete with its high resistance to compressional stresses, can readily take care of this compression at the top, and a small iron or steel rod or rods are placed in the concrete at the bottom to take care of the tension. Thus, a reinforced concrete beam performs satisfactorily all the duties of structural iron, with a great diminution in cost of production and a considerably better wear factor, since the iron girder would need frequent coats of paint, and the concrete needs no attention whatever. This represents the secret of reinforced concrete and its development renders the application not only of itself but of concrete also possible in many applications where neither was used formerly.

Thus, take the one department of mine timbering; concrete, while satisfactory for uprights, required some other material for cross beams, and the combination of the two with the difficulty of installation rendered it generally unavailable. Today, however, the great diminution in available supply of timber, with its corresponding increase in cost, and its rapid deteioration in mines on account of decay, made the substitution of concrete and reinforced concrete not only a possibility, but a probability, in this field.

Timbers are used in the great majority of cases for bracing and supporting the roof in the coal mines of Pennsylvania. Pine is the chief available lumber, and this is generally shipped green and unstripped from the forest to the mine direct, and used immediately. Under these conditions all the detractive agents possible work with rapidity, and the ravages of insects, the effect of moisture and the rotting at the bases, render renewals of great moment. Of late years numerous attempts have been made to preserve the wood in such mines. It has been found that stripping the timber of bark and weathering diminishes the ravages of insects and prolongs the life of the wood; but with even these precautions, the life of the wood is of short duration and the cost of maintenance in this field is large when the cost of material and installation is considered.

Of the attempts at preserving wood,* the majority have been more or less satisfactory. Creosote is the chief preservative. Carbolinium has also been used and has proved satisfactory. Zinc chloride and salt solution are sometimes used, but are not as satisfactory as creosote. The impregnation by creosote by the tank method is not as satisfactory as the pressure method. The increase in life in the two cases varies from forty to fifty-five per cent. of that of untreated wood.

With an increase of only fifty per cent. in the life of wood subjected to the best known preserving process, regardless of cost, it can be said that the problem of timbering or at least sustaining the walls and roof of a mine has not been satisfactorily met, and that this difficulty will become more and more pronounced with increased scarcity of timber.

Concrete offers an ideal substitute for wood. Almost impervious to ordinary decay, it can take the place of gangway timber such as is used in the main haulage ways and cross beams and ordinary structures wherever needed; thus completely eliminating the use of wood in a mine, under all circumstances. With the increased development of mining on a large scale more and more mines come under the head of permanent institutions. Long lines of passage ways are practically permanent for many years to come in a greater number of mines. As time goes on, with the ordinary timbering at present in use, these passageways are a constant source of expense in repair and renovation without any return from this point.

There is no reason why many of the mines in existence today should not be finished through a large portion of their interior as completely and permanently as many of the tunnels of railroad companies or of those existing in the large cities. Both have become practically permanent institutions and as such should receive proper treatment. The great diminution in the cost of cement renders this not only possible, but an extremely desirable feature at the present time, with not only a saving in the cost of installation, but also an improvement in the means of communication and a

*See article on the Preservation of Mine Timber by John M. Nelson, in The Mining World, May 25, 1907.—Editor.

preventive of many serious accidents. Thus much of the danger due to fires in mines would be removed. The mines could be kept cleaner, ventilation could be accomplished more easily, and the possibility of fire damp, common in many coal mines, would be almost completely removed if the face of the coal or other material was entirely cut off by a layer of concrete, except at the working front.

Not only could permanent ways be constructed of cement and reinforced concrete, but the temporary supports could be as easily developed. Columns could be made in pieces of concrete blocks and readily placed in position. Cross beams could be made in a regular form in position on the columns and rapidly filled up without much of the manual labor incident to the installation of timber. Not only would the entire operation of the mine be simpler and less expensive, but the possibility of accident or danger to fire would be almost completely removed and a degree of cleanliness never before imagined could exist. This would tend to increase the life of such machinery as must remain in position, and the saving and increased convenience of operation would be immense in every imaginable line. Even if such an installation did cost more than timbering, its manifold advantages warrant its utilization. However, the situation exists today that the difference in cost, if any, is dependent upon local conditions entirely, and is variable with the availability of a supply of concrete or timber to the individual mine.

This, of course, represents the chief application of reinforced concrete in mining operations. While this substitution for timber is its chief development there are a number of others. Drainage tanks, bases for all machinery, and, in many cases even supply pipes, can be made of reinforced concrete. Above the surface, or in the working of the material for the market, concrete plays a very important part. Copper electrolytic purifying pans are made of concrete in preference to other material. Further, buildings of this material are cheaper and better than any other type. And, lastly, all dams, pen stocks and other structures for hydraulic work, if water power is available, can also be made of the same material. The application of concrete and reinforced concrete to mining operations is only at its inception, and very few mining engineers or mine owners realize the remarkable development probable in this field.

California produced 3,250 pounds of chrysoprase, in the rough, valued at $32,470, in 1906.

Sulphur and Arsenic Determinations

By W. C. Ebaugh and C. B. Sprague.*

A method involving the use of sodium carbonate and zinc oxide for sulphur and arsenic determinations was devised by one of us some years ago, and has given uniform satisfaction in various assay offices for a long time.

One part of dry sodium carbonte and four parts of zinc oxide are mixed thoroughly. In the case of sulphur determinations a weighed sample of the material to be analyzed (usually one-half gram) is mixed intimately with enough of the sodium carbonate-zinc oxide re-agent to afford at least twice as much sodium carbonate as would be equired by the sulphur, arsenic, etc., present, and placed in a small porcelain dish, covered with the re-agent and heated to redness in a muffle for fifteen or twenty minutes. A shorter period of heating is usually sufficient, but the time here specified is ample for all cases. The residue is then extracted with water, boiled and filtered, the filtrate made acid with hydrochloric acid, precipitated with barium sulphate treated as usual.

In an arsenic determination the substance is treated as above, until the alkaline solution is filtered from the residue. This filtrate is acidified with acetic acid, precipitated with silver nitrate, boiled for a few minutes and then filtered. The precipitate of silver arsenate is washed thoroughly with hot water and then dissolved in dilute nitric acid, its silver content being determined finally by titration with ammonium or potassium sulphocyanate in the usual way. Ferric sulphate is used as an indicator. In calculating the arsenic present, us the proportion:

3 Ag; 1 As:: Weight of silver found: Weight of arsenic present.

The method has been tried successfully with various sulphides such as galenite, pyrite, arsenopyrite, chalcopyrite, sphalcrite, etc., with sulphates like gypsum and anglesite; and with metallurgical products like matte, spiess and flue-dust. In the case of heavy spar analyses, the method is not superior to the ordinary fusion with an alkali. The fact that the decomposition with sodium carbonate and zinc oxide has been employed for control and umpire assays upon ores in commercial work for so long a period without objection is evidence that the results obtained by the method are accurate.

It will be seen that the method for sulphur is a modification of the well-known Eschka method, and that for arsenic is an improvement upon Pearce's method. The advantages of the decomposition described are (1) that the mass resulting from the heating is not fused, but can readily be removed from the dish and leached with water; (2) the ease and speed with which sulphides, sulphates, arsenates, etc., are decomposed; (3) no time-consuming subsequent evaporations are necessary, and (4) the absence of a large quantity of alkaline and other salts from the solutions in which the precipitations of barium sulphate and silver arsenate are effected.

*Journal of the Western Association of Technical Chemists and Metallurgists.

The Copper Situation

By Geo. L. Walker in Boston Commercial.

All the large producers are now a unit in asking 18½ cents for lake and eighteen cents for electrolytic copper. They have maintained this position for a week or two past and a considerable volume of business has been done. Quite heavy sales of electrolytic have been made in Europe at eighteen cents and domestic consumers quite generally have been buying for September delivery. Sales of lake have been made recently at 18½ cents. These prices, therefore, make the market for the time being, and it is very good opinion that they will be maintained throughout the remainder of the year.

The money situation is at the bottom of the extreme reversal of conditions which have come about in the metal market in the past six or eight weeks. When the American Telephone Company failed to raise money for the usual yearly extension of its lines and the Western Electric Company as a result forced to close down its wire mill, the change from an excess of consumption to an excess of production began. The money market must be blamed. Since then it has been practically impossible for independent telephone companies, street railroads, and a very great majority of other electrical enterprises to raise money for new construction work. The consumption of copper has thus been arrested temporarily, probably to the extent of twenty-five per cent. This condition will continue until money is easier; and money will grow easier very rapidly if the retrenchment in general business conditions continues. It was the abnormal volume of business that used up the world's money supply. Business conditions are getting back to normal, and within two or three months we shall surely have normal money market conditions again.

The claim that there is an accumulation of 200,000,000 to 300,000,000 pounds of copper is absurd. It is possible that producers hold a total of 100,000,000 to 150,000,000 pounds of unsold copper which is refined and ready for consumption. To claim that the amount is greater than this, however, is to argue that consumption has decreased seventy-five per cent. within three months, which of course, is impossible. The limited amount of investigation which I have been able to make since my return from the West convinces me that all the unmanufactured copper above ground is held by producers. Under normal conditions all consumers would be carrying at least 100,000,000 pounds in their working stocks. As soon as money conditions ease up slightly this copper will change ownership. In the meantime there is no other class of corporations in existence, not excepting the banks, which is in as good condition to finance 100,000,000 to 200,000,000 pounds of copper as the producers themselves. Their treasuries are strained to the bursting point with profits which have accumulated during the past three years of high priced copper.

The reversal of conditions has given the trade a severe "jolt," and it is natural, therefore, that pessimistic opinions should be heard on every side. It is not impossible, of course, that the "worst is yet to come;" but I feel perfectly satisfied myself that the world's copper production during the coming two or three years will be absorbed and consumed at eighteen cents per pound, provided producers are wise enough to be united and firm in asking that price. It must be remembered that electrical development the world over has only just begun.

The coppers are recovering slowly and fitfully from their lowest prices. There are realizing sales and short selling on every rally, and at times the market acts as though it were about to slip back to even lower prices than those recorded a few weeks ago. The lines of stocks carried on margin by active traders have been very greatly reduced, however, and large and small investors are heavy buyers at this level of prices. Some of the low price speculative specialties may decline very much lower; but it seems impossible that stocks representing the best mines can ever sell very much below current quotations.

Such coppers as Amalgamated, Anaconda, Allouez, Boston Consolidated, Butte Coalition, Calumet & Arizona, Copper Range, Cumberland Ely, Greene, Granby, Nevada Consolidated, North Butte, Old Dominion, Osceola, Quincy, Shannon, Utah Copper and Utah Consolidated are all worth very much more than their present selling prices, and investors who have the courage to buy them will not only get a heavy dividend return, but within a few years they will be able to sell them at much higher prices.

Though I do not make any pretense of being a crop specialist and do not keep myself supplied with statistics of consumption and market prices of wheat and other grains, I obtained some information during my recent extended trip through the West which leads me to believe that the prices of wheat, corn and oats will be higher this year than they are at present, and also that the average prices of these grains are likely to rule higher for several years to come.

The agricultural interests of the West are probably feeling the pinch of the stringent labor market more than any other class of employers. In the first place the man who raises wheat cannot be expected to be as closely in touch with world wide industrial conditions as business men in other productive lines. He was slower, therefore, to consent to the demand from his employes for higher wages. As a result farm laborers as a class have left the ranches and are driving teams on railroad grades and irrigation works, doing surface work in the big mining camps, or are engaged in other branches of outdoor employment. The ranch owner has been forced at last to pay higher wages for labor; but, viewed from an economic standpoint, it is the fact that an adequate supply of labor is no longer obtainable in the farming districts that is important.

Riding on the trains through the wheat, corn and oat belts, I was constantly reminded of the scarcity of labor by the many fields which bore crops last year and which this year lie fallow. On my return East I saw an unusually large amount of winter wheat lying in the fields waiting for the threshers. Some of this wheat had been blackened by rains, and a great deal of it had been handled and piled into big stacks to await the coming of the threshers. It is very apparent that owners of threshing mills are finding it too difficult to obtain the necessary labor to do their usual volume of work. It takes as much time to thresh a short crop of wheat as a long one, a very large portion of the time being consumed in moving about from place to place and setting up and taking down equipment. Unless the adequate supply of labor is available in threshing time the work is very greatly delayed.

A number of years ago I spent a summer in eastern Kansas and saw the corn crop grow to maturity. Since then I have travelled back and forth through the corn belt a great many times and I am satisfied that the corn which I saw growing two weeks ago will not make a good showing at harvest time. I have never before seen weeds as high as the corn and I am sure that it would not be this way now were it not that there has been a scarcity of farm labor all this year.

I don't expect either the wheat or corn crop to fall very far short in number of bushels per acre as there has been no great general damage by drought or rust; but I feel very sure that the splendid totals harvested last year will not be repeated. It must be remembered also that there are at least 3,000,000 more people to feed in this country, and that crop conditions abroad are not such as to warrant the belief that there will be a falling off in the export demand. It seems to me, therefore, that we must be satisfied with the present level of prices in the grain markets and look for their continuance throughout the winter. I shall not be surprised to see both wheat and corn sell considerably higher on the next rally than they have sold on the one which now seems near its culmination.

IMPORTS AND EXPORTS OF COPPER.

In August the imports of copper, not including ore, amounted to 16,867,134 pounds, valued at $3,425,379, as compared with 12,578,745 pounds, valued at $2,156,369 for August, 1906; for the eight months ended August, 141,568,857 pounds, valued at $30, 058,659, were imported as against 113,370,819 pounds, valued at $13,940,777 in 1906, and 98,001,732 pounds, valued at $13,581,173 in 1905.

The exports of copper in August amounted to 29,695,950 pounds, valued at $6,198,117, as against 46,789,702 pounds valued at $8,607,431 in August, 1906. For the eight months ended August, the exports amounted to 241,790,991 pounds, valued at $56,866,515, as against 309,664,379 pounds valued at $55,539,944 in 1906, and 379,543,010 pounds, valued at $56,007,252 in 1905.

The Telluride Journal says enough gold was shipped out of that town a few days ago to pay the President's salary for a year. The Tomboy, Liberty Bell and Smuggler companies all shipped out a bunch of retorts to the Denver mint. These occurrences come so regular of late that little or no comment is caused by them, but it is seldom all three companies make a shipment the same day.

Origin of Diamonds

By Dr. Voit*.

"As to the carbonic matter, the idea has been suggested that this may have been derived from the carbonaceous shales which are penetrated by the pipes. This is a very far-fetched idea indeed, that diamonds extend towards depth where no carbonaceous formation but granite forms the walls (Kimberley mine, 2,500 feet level.) Besides that, we have found shale fragments in the pipes containing small seams of anthracite. In this case, then, the coal in the shales by contact metamorphism was simply altered into anthracite. That carbon exists in some form or other in the interior of the earth we may take as granted, as we know that active volcanoes exhale great masses of carbon dioxide. Furthermore, graphite occurs in the very oldest rocks of Lauretian age whose magmatic character is agreed upon even by the most stubborn Neptunists, and I venture to hint at the idea that occasionally diamonds may have crystallized out in solidifying magmas of the earth's earliest periods; this then, would explain the occurence of diamonds as part of the detrius of those old magmatic rocks in the old sedimentary formations mentioned above. Carbon no doubt exists in the interior of the earth, and is associated with ascending magmas. Indeed, we find carbonic matter plentiful in its graphite form in the pipes, and I think it is of great interest that in the eclogite concretions of the Roberts Victor graphite has been found together with the diamonds. It goes without saying that it must have been an original constituent in the Kimberlite magma.

While Friedlnder's experiments shew us that the formation of diamonds in an olivine magma is possible, and will be possible in such a similar magma as blue ground. Moissan's experiments shew us that carbon and iron under heat and great pressure will produce diamonds. Frank's experiments finally point to the probability of producing carbon in its densest crystalline form with the help of a mineralising agent or crystallisator such as metallic carbides, and pressure. I am, of course, not going to say that a great pressure will be necessary for forming diamonds directly, or that we could produce diamonds by compressing carbonic matter, but, indirectly, pressure will have an influence as crystallisator, as the powerfulness of a mineralising agent is in direct relation with heat and pressure. That the solidifying Kimberlite magma was under great and even excessive pressure can be easily imagined if we assume, as above described, that the Kimberlite magma never reached the surface. We may very well imagine that after the pipe was formed and filled chiefly with its mineral contents, which sometimes were forced into ascending cracks and fissures of the overlying roof, the magma began to solidify. The first minerals, crystallising out, were, of course, diamonds, as these can stand the greatest heat, after which garnets, pyroxenes, micas, etc., were formed as minerals whose stability towards heat is not so great. Under normal circumstances a fully crystalline rock, similar to eclogite, might have resulted. A series of secondary extrusions, however, especially of gaseous character, worked on the semi-plastic magma, when the temperature was lowered already to such a degree that in consequence of the increasing viscosity the magma was not influenced any more by the mineralising agent, which lost its mineral producing character. With regard to the mode of occurrence of carbon in the magma, the idea has been suggested that either carbon dioxide, or carbon in some liquid form may have been present. According to Moissan's and especially Frank's experiments, I think that carbon in the form of metallic carbide was a constituent part of the magma when it forced its way into the pipes. According to the pressure under which the Kimberlite magma existed, diamonds crystallized out in a more or less perfect state; either in clear, perfect crystals, sometimes coloured by iron or in imperfect stones or aggregates of same, full of cracks and fissures filled with graphitic matter or sures, filled with graphitic matter or hydroxides of iron or similar metallic contents. Finally, if physical and chemical conditions were not favourable, metallic compounds, or graphite, or carbon dioxides, etc., were formed. The richness of the Kimberlite will depend on the amount of metallic carbides present in the magma and on the pressure under which it was during the cooling down, and we can easily imagine that the conditions locally were such as to give origin to diamonds in fissures occasionally, or, on the other hand, not to produce any diamonds in the pipes at all. The idea, therefore, that on a fissure vein comparatively rich in diamonds, the pipe when found must be very rich is entirely erroneous and based on wrong ideas of the genesis of the pipes and dykes. On rich fissures we may find very poor pipes, and vice versa rich mines may lie on blank fissures."

*Member of the Geological Society of South Africa.

The Hydraulic Cartridge

English coal miners are using a machine intended to take the place of explosives, called a hydraulic cartridge. At present coal is blown down with powder after the undercutting is completed. In the use of the cartridge, after the undercutting and shearing are finished, a hole of three and one-half inches in diameter is bored in the coal parallel with the roof, wherein the cartridge is inserted. A piston operates at one end and a pump at the other. The pump forces the water along a tube until it comes in contact with the first piston and pushes it out. The pressure becomes general on all pistons, which commence to penetrate the coal in a downward direction. The pistons are set very close, there being scarcely half an inch between them. As the pressure increases the coal gradually leaves the roof and falls to the floor in the best salable condition.

When powder is used in blowing down coal there is considerable waste through breakage into dust and slack. It is claimed that this element of waste is greatly eliminated by the use of the cartridge, and 40 per cent. more salable coal is produced than by the ordinary methods of mining. The weight of the entire apparatus is forty-four pounds. One man can operate it. The amount of water required is from a pint to a quart, according to the pressure needed to bring down the coal. The water is stored in a little reservoir attached to a pipe, and runs to the bottom of the pump. The machine is supposed to be especially serviceable in long wall and pillar work.

It is estimated that about $6,000,000 worth of gold is used annually in dental work in this country, and $2,500,000 worth of gold leaf by sign painters. Including other branches of art, the grand total will probably aggregate $12,000,000 to $15,000,000 a year.

By experiments recently made at the Institute of Technology, one ton of peat taken from a bog within twenty miles of Boston produced 100,000 feet of gas, fifteen gallons of tar and five gallons of paraffin, and it is claimed from the six per cent. of ash innumerable by-products could be obtained.

American Smelting and Refining Annual Report

The American Smelting & Refining Company's income account for the year ended April 30, 1907, compares as follows:

	1907.	1906.
Earnings	$13,250,058	$11,665,885
Bet. & repl.	976,534	828,582
Balance	$12,273,524	$10,837,303
Taxes and general expenses	763,854	675.945
Net earn.	$11,509,670	$10,161,358
Approp.	†1,595,416	†1,387,303
Balance	$ 9,914,254	$ 8,774,055
Pfd. divs.	3,500,000	3,500,000
Balance	‡$6,414,254	5,274,055
Com. divs.	3,500,000	3,250,000
Surplus	$ 2,914,254	$ 2,024,055
Pres. surp.	10,482,775	8,458,720
Total surp.	$13,397,029	$10,482,775

	1905.	1904.
Earnings*	$10,506,683	$ 9,425,443
Bet. & repl.	878,648	818,141
Balance	$ 9,628,035	$ 8,607,302
Taxes and general expenses	729,224	701,729
Net earn.	$ 8,898,811	$ 7,905,573
Approp.	*1,279,899	*1,188,836
Balance	$ 7,618,912	$ 6,716,737
Pfd. divs.	3,500,000	3,500,000
Balance	$ 4,118,912	$ 3,216,737
Com. divs.	2,500,000	1,250,000
Surplus	$ 1,618,912	$ 1,966,737
Pres. surp.	6,839,808	4,873,071
Total surp.	$ 8,458,720	$ 6,839,808

†Does not include appropriation for metal stock account. ‡Equivalent to 12.82 per cent. on $50,000,000 common stock. *For extraordinary improvements and metal stock account, etc., including employes' profit sharing fund.

The general balance sheet as of April 30, 1907, compares as follows:

Assets.

	1907.	1906.
Pr. and acct.	$ 86,845,670	$ 86,845,670
*Inv. acct.	3,810,595	4,179,914
Met. on hand	18,251,587	19,415,200
Material	1,317,544	1,114,893
Cash	6,706,984	4,757,929
Total	$116,932,380	$116,313,606

	1905.	1904.
Pr. and acct.	$ 86,845,670	$ 86,845,670
*Inv. acct.	3,982,576	1,680,306
Met. on hand	16,418,543	17,032,300
Material	1,118,902	1,224,688
Cash	4,636,649	4,047,423
Total	$113,002,340	$110,830,388

Liabilities.

	1907.	1906.
Cap. stock	$100,000,000	$100,000,000
Bonds	457,000	549,000
Net cur. lia.	439,051	2,360,966
Margins	2,639,301	2,920,865
P. & L. sur.	13,397,028	10,482,775
Total	$116,932,380	$116,313,606

	1905.	1904.
Cap. stock	$100,000,000	$100,000,000
Bonds	561,000	920,000
Net cur. lia.	1,855,641	638,610
Margins	2,126,979	2,431,969
P. & L. sur.	8,458,720	6,839,808
Total	$113,002,340	$110,830,388

*Does not include 177,510 shares of the common stock American Smelters Securities Company, par value $17,751,000.

President Daniel Guggenheim, in his report to the stockholders, says in part as follows:

The business of the company has made the same uniform progress during the past year as in the recent preceding years, as is evidenced by the following table of net earnings covering the past eight years:

	Net Earnings.
1907	$11,509,669
1906	10,161,358
1905	8,898,811
1904	7,905,572
1903	7,576,785
1902	4,861,619
1901	3,828,441
1900	1,979,908

Note—The capital stock for the years 1900 and 1901 and four months of the fiscal year 1902 was $65,000,000; for the balance of the fiscal year 1902 and the succeeding years the capital stock was $100,000,000.

Net earnings for the year under review amounted to $1,348,311 in excess of the earnings of the preceding year. The expenditures on account of ordinary repairs, betterments, improvements and new construction have amounted to the sum of $2,031,530, which has been entirely deducted from the profits of the year. The valuation of the property of the company, therefore, has remained unchanged, and its efficiency and physical condition remain entirely satisfactory. There has been added to the surplus of the company during the year $2,914,253. The surplus of the company now amounts to a total of $13,397,028. Notwithstanding the fact that the metal stocks of the company in process of smelting and refining were valued at the beginning of the fiscal year at figures which were eminently conservative, yet the directors have not deemed it advisable to increase these valuations, although high prices have prevailed during the year.

No material change has been made in the valuation of the investments of the company. A reduction in the total value has been due to the sale of a portion of the stock of the United Lead Company, owned by this company and referred to in the last annual report. No valuation has been placed as yet upon the common stock of the American Smelters Securities Company, owned by the company, of a par value of $17,751,000.

The earnings of the Securities company for the fiscal year ended May 31, 1907, left a surplus, after payment of dividends on its preferred stock, of $532,660. The surplus of the company to date amounts to $1,016,744.

Due to the extraordinary shortage of cars in Mexico, the company has accumulated about 45,000 tons of ore at its mines, which it has not been able to ship nor secure financial returns thereon.

WHO DISCOVERED THE KLONDIKE?

The Canadian Mining Journal claims that evidence has been gathered which shows conclusively that to Robert Henderson, Pictou, Nova Scotia, belongs the honor of being the discoverer of Klondyke. In 1894 Henderson was outfitted at Ogilvie by his friend Joseph Ladue. The summers of 1894 and 1895 he spent in prospecting the streams of the Indian River valley. During the winters of these years he mined alone on Quartz creek. In the summer of 1896 he discovered gold in Hunker Creek valley, or Gold Bottom, as he himself named the district. Provisions gave out in August, and Henderson was forced to go to Ogilvie for fresh supplies. On his way back to Gold Bottom, by the Klondike river, he spent a night on the present site of Dawson. It was here that he came upon Carmack. To Carmack, Henderson made known his discovery, and invited him to come up to Hunker creek and stake. Carmack followed in a few days, staked near Henderson's discovery and, returning, discovered gold in Bonanza creek. Of this discovery Carmack did not notify Henderson, but proceeded to Forty Mile, where he spread the news. At first his story was received with incredulity, but before long the stampede began, and the new fields were staked out before Henderson had been informed of their existence. Owing to complications, Henderson was refused a discovery claim on both Gold Bottom and Hunker branches of the river. He was, however given the choice of staking one ordinary claim on either Gold Bottom, Hunker, or Bear creeks, or the equivalent of one out of five claims staked before others. Carmack's ingratitude lost to Henderson the chance of controlling the richest deposits of the north.

The prospector's supply outfit for six months is rated as follows: Flour, 120 pounds; beans, 25 pounds; bacon or salt pork, 25 pounds; sugar, 25 pounds; coffee, 5 pounds; tea, 2 pounds; salt, 3 pounds; soda, 2 pounds; pepper, 4 ounces; rice, 20 pounds; dried fruit, 20 pounds; cornmeal, 5 pounds. Total weight, 252 pounds, 4 ounces.

Mining Letters from Correspondents

Mines and Mining Wishes to Secure an Actual Reputable Correspondent from the Mining Centers of the World

Denver

Oct. 15.—The mill and smelter trust of Teller county has just announced an important reduction in the freight and treatment charges of Cripple Creek ores, that went into effect this week The reduction is as follows:

Value	New Rate	Old Rate.
$10 and under	$ 5.25	$ 6.25
$10 to $15	5.75	7.50
$15 to $20	6.50	8.00
$20 to $25	7.25	9.00
$25 to $30	7.50	9.25
$30 to $40	8.50	10.25
$40 to $100	9.50	11.50
$100 to $150	12.00	13.00
$150 to $200	14.00	15.00

Under the old rate the $11.50 charge included only three-ounce ore, anything in excess being charged at a different rate. The new schedule makes five-ounce ore $9.50, which is a material reduction.

This new rate will enable lessees and operators in the Cripple Creek district to ship much lower grade ore than has been heretofore possible.

The cause of the new reduction cannot be determined, unless it is that the Cycle mill, which made a deep cut in rates prior to its destruction by fire, is being rebuilt, and also because James F. Burns of Colorado Springs, is reported to have entered into an arrangement with Augustus Heinze, the multi-millionaire copper king of Montana, for the erection of a mill and smelter on a tract of land in Colorado City for the treatment of Cripple Creek ores. If Burns enters the field it will mean a cut in the present low rates, which are the best that have ever been offered in this district.

Reports Tuesday from New York represent a heavy drop in the stock market and consequently a lowering of membership prices of the New York Stock Exchange. A seat was sold Monday for $68,000, the lowest price since the break of 1903 began. In the depression which followed and extended into 1904, seats sold down to $50,800.

That year memberships hardened in value until in the early part of 1906, when a high record price of $97,500 was reached.

Losses sustained by members in the fall in stocks and bonds this year have caused a number of brokers to offer their memberships for sale and prices of seats have fallen.

A dispatch yesterday from Shoshone, Idaho, on the Oregon Shirt Line, stated that the large copper vein at the Boysen camp had been cut by the cross-cut tunnel in a distance of 500 feet in the heart of the mountain.

A corps of engineers is at work in the camp and a new and larger boiler has been ordered, and from these facts it looks as if extensive development were on foot.

This is the section of land granted to Asmus Boysen at the time the Shoshone Indian reservation was opened and comprises some of the most valuable mineral land in that section.

Bisbee, Arizona

October 15.—In this county are located the famous mines at Bisbee and everybody knows about Bisbee. Over on the West side of Cochise county the great range of the Whetstone mountains rear their craggy peaks skyward. About eighteen miles south of Benson on the S. P. railroad, twelve miles west of Fairbank on the south branch of the same road, Mr. J. R. Emmons of Tombstone, owns a mighty promising prospect. Two shafts, one forty and another thirty-five feet deep, and a tunnel in about eighty feet, denotes the amount of work done. Mr. Emmons owns seven claims on a ledge from four to ten feet wide. His ore in ton lots averages $12 in silver and twelve per cent. copper. This is more than an ordinary showing, and Mr. Emmons who is an old-time prospector is to be congratulated. The gentleman is well spoken of and his friends are pleased.

Adjoining the Emmons' property Larrieu brothers of Benson own six claims and they are now engaged in taking out shipping ore. They have about 1,000 feet of work done and are in sulphide ore.

The country rock is porphyry and lime. The top of the Whetstones seems to be a bastard granite. The veins are fissures and blankets. Prospecting in this section is picking up in good shape.

New York

October 15.—F. Augustus Heinze, the Montana mining man, created a sensation in Wall street Monday that opened the eyes of the bulls and bears all along the line. The surprise occurred in United Copper, commonly known as the Heinze Copper Holding Company, which at one time owned the copper mining concerns in Montana that waged persistent war against the Amalgamated or Standard Oil group of mines.

According to reports, Mr. Heinze wagered $25,000 with one of his friends that United Copper shares would sell higher than Amalgamated Copper, his old-time rival. Saturday United Copper closed at 35¼, the price of the last transaction, but the best bid that day at the close was 35. Amalgamated Copper Saturday closed eighteen points higher than the bid for United Copper. Several of Mr. Heinze's friends laughingly told him Saturday night that the bottom would drop out of United Copper.

At the opening of the curb market Monday the best bid for United Copper was 30, and it was offered at 40. Amalgamated Copper opened at around 52½ and quickly sold up a point. In the first hour the curb market was violently excited by the sensational maneuvers in United Copper.

Heinze brokers bid 100 shares at 41 and then boosted the price point by point, without a transaction, to 50. There was a "cross sale" of 100 shares at 50, and in less than a jiffy 60 was bid for 1,000 shares.

A few more "cross sales" occurred on the way up to 60 and when E. A. Sickel, a broker, bid 60 for 1,000 shares, the curb market stopped business and brokers wildly announced a corner in United Copper. A few shorts were pinched as the price advanced, but the brokers making the prices allowed but few to interfere.

Joplin, Missouri

October, 15.—All other questions of importance in the lead and zinc fields of the Missouri-Kansas-Oklahoma-Arkansas mining camp are being merged into that of the coming meeting of the American Mining Congress in Joplin, November 11th to 16th, inclusive.

Every facility for seeing and inspecting the mines, and the machinery used in its concentration is being provided for by the operators and the committees. There are within a radius of thirty-five miles of Joplin over 500 concentrating mills, with an average capacity of 150-tons each, a few of of which have a 250-ton capacity, while some three or four recently built, have a 500-ton capacity.

Besides the trip to the mines a very

fine exhibit of ore is being placed in Germania hall, under the direction of Mr. C. Guengerich, which have been gathered by the producers from the mines of Galena, Baxter Springs, Hiami, I. T., northern Arkansas, Oronogo, Prosperity, Duenewег, Carterville, Webb City, and Joplin. Also an exhibit of mining machinery, with a few new inventions in that line, will be made, that all the steps taken in bringing this district to its present prosperous position in the mining world may be studied. By considering ore formations and ground conditions, with machinery used, one finds ample demonstration of the advance mining is making in the scientific as well as in the industrial world.

Of the many subjects to come up during the various discussions none will be more interesting than that of "Uniform Laws Governing Metaliferous Mining and Quarrying in the Various States," "Prospecting for Oil and Gas," "Lead and Zinc in the Southwest Field," "Tariff on Zinc Ores," and "The Waste of the National Mineral Resources," all of a very practical nature.

Nor will these discussions wholly push aside a few of the purely speculative questions, such as "Will the Production of Gold in the World Keep Pace with the Increasing Demands of Commerce and Trade." "How Long Will the Iron Ore and Coal Supplies Meet the Demands of Commerce and Trade?" and "The Possibilities and Limitations of Geological Survey Work as Applied to the Mining Industry," and "The Importance of the Mining Industry to the Industrial and Commercial Life of the Nation."

One of the vital issues in every metal camp is that of the relations of the smelter to the producer in fixing the rates or determining the ore values, which is probably the one question of greatest importance in the mining world. There seems to be nothing like this determining the ore values in the channel of commerce, because nearly everything is under state regulation, but this one industry, second only to the agricultural interests, the value of ore being entirely determined by the buyer, and for this and many other reasons, this congress will ask for the revision of the state laws, the enactment of national legislation, looking toward the encouragement of honest competition, and where there are differences toward their amicable settlement.

This organization of mining men will ask the United States government to create a new office in the President's cabinet, that of Secretary of Mines and Mining, which the growing complexity of the metal world demands. Mining, now one of its chief industries, is made possible by the advancements made in the scientific world, otherwise the industry would still remain, as among the ancients, an undeveloped resource, a loss because there is that about mining that speaks of generosity, of talents wrought into wisdom, making man capable of great things and great influence.

Los Angeles, California

October 15.—The Los Angeles Chamber of Mines, composed of representative mining and business men of that enterprising city, has for its objects and purposes the business of keeping its members and citizens posted right up-to-date on all matters pertaining to mining, smelting and the treatment of ore. The membership fee is one dollar per year. Reports on mines are furnished when desired and general information to its members. Wildcat schemes are exposed and denounced and honest mining methods encouraged.

Many of the most prominent business men of Los Angeles belong to it, and its power for good is being felt everywhere in the Golden State. Such organizations are of great benefit and go far toward establishing the mining industry on a sound basis.

Moctezuma, Mexico

October 15.—The city of Moctezuma is very old, and its history is interesting. There is one church—Catholic—parts of which are over 318 years old. The population of the city numbers about 4,000 persons. There are about twenty-two "gringos" in the place, as foreigners are called. The Mexican population are of the best class of that nationality in the republic. The city boasts a good bank and two American hotels. Among the Americans in Moctezuma may be mentioned R. S. Vicars, George St. John, C. C. Delancy, E. M., F. W. Fourr, L. R. Smith, J. P. Williams, Charles and Fred Hyde, mining engineers; H. R. Rawlings, George Woodward, Ed De Pew, Ed Flickenger, J. E. Eubanks, J. E. Benton, R. S. Hoag, D. L. Cosgrove, and others.

These gentlemen are mostly engaged in mining.

The Moctezuma district is one of the oldest and most foremost mining districts in Mexico. It contains some very valuable high-grade properties, among which may be mentioned the Lampasses, bonded to Los Angeles, California, people for one and a half million dollars. It is said to be worth more than $10,000,000. It has produced nearly, if not quite, $800,000 per month for five years and some people class it as one of the richest mines in Mexico.

The Promontorio copper mine is another large proposition. The owners of it have been offered $1,300,000 in gold for sixty per cent. of it, and the offer was refused.

The Monte Cristo mine is a silver mine, the ore of which runs all the way from 500 to 1,500 ounces per ton. A one-half interest in it was recently sold to Francisco Gallego for $80,000.

There are thousands of claims in this country as valuable as the above.

The new railroad now being built will pass through Moctezuma and open up some of the richest mineral land on the globe. The city is destined to prosper and become great. The climate of the country is delightful and besides its vast mineral wealth, alfalfa, vegetables, fruit of all kinds, including oranges, lemons, figs, dates, etc., can be raised. The bank is safe, carefully managed and has a capital of $150,000. Men who go to Moctezuma are treated fairly by the people there, because they have faith that they have a big mineral country—big enough and rich enough for all comers. The future prospects of this district are very bright.

Cananea, Mexico

October 15.—The American vice consul, J. B. Breathitt, of Cananea, Mexico, has forwarded a report outlining the industrial activity and progress in the Cananea district for the fiscal year ending June 30, 1907. In the document Mr. Breathitt says:

"The principal industrial achievement of the last fiscal year was the consolidation brought about by the Green Consolidated and the Cananea Central Copper Mining companies, with a combined capitalization of $60,000,000, par value of shares $20 each, and the issue of $50,000,000, $3,000,000 of which were placed in the treasury of the new company at the time of reorganization, for the purpose of making improvements at the mines, smelter, concentrator, railroad lines of the company extending to its properties, a total of over thirty-five miles of trackage. Included in the plans is money enough to build additional smelter capacity, which will give the company 10,000,000 pounds more of blister copper per month at a greatly reduced cost in its production.

"In the mines there is at the present time more ore and of better grade than ever before in their history, the most important body being at a depth of 1,050 feet, indicating that the camp

is destined to a long life of heavy production. The Green Cananea Company's mineral lands are covered by a bonafide title from the Mexican government, and embrace a greater mineral area than that possessed by any other mining company in the world, about 38,000 acres.

Including nearly $9,000,000 cash in the treasury and other extensive holdings, the company's assets, not including its lands, will aggregate $20,000,000 in round numbers.

"Engaged in the mining industry in Cananea district beside the Greene Cananea are twelve operating companies, seven of which belong in the producing list. The largest representative of these is the Phelps-Dodge Indiana Sonora Company, which is shipping to Douglas 150 tons of high grade ore daily and could readily increase the amount several times were shipping facilities available. This company will eventually add to an aerial tram system which it operates and then be enabled to reach the railroad of the C. Y. R. R. and P. direct, avoiding the necessity of using the crowded trackage of the Greene Cananea.

"Ranking with the Phelps-Dodge property as a producer and a great mining property is that of the Democrata Mining Company, which operates its own smelter in Cananea and is producing an average of about twenty tons of matte to fifty tons or more daily. When the site which will be occupied by the new Greene smelter is determined upon it is the intention of the Democrata to seek nearby location, where it can enjoy the same facilities which will be available to the enormous Greene plant, which will double that company's present output of about 5,000,000 pounds per month. At its new smelter site, the Democrata will build a smelter which will have initial output of somewhere in the neighborhood of 1,000,000 pounds per month and will be increased to higher figures steadily.

"The Arizpe Development follows these properties in importance. It is a shipper of high grade ore, holds a large acreage of richly mineralized ground and will upon the installation of machinery, which is now going in to enable extensive production from its mines, in all likelihood build a smelter of 1,000,000 or more pounds initial capacity on its property eleven miles south of the city of Cananea. In this vicinity are also a number of other properties with development under way attended by highly encouraging results. Survey has been made for a railroad down the river into this country for the service of these mines and it will doubtless be built when their development reaches a little further stage.

"Closer in to Cananea are the West Cananea, operating under management of the Charles M. Schwab interests, the Cananea Bisbee, developing by the Thompson-Guggenheim interests, the Calumet Sonora, of Michigan interests, the Thomas F. Cole, Lindsay and Talbot interests on the bonanza de Cobre, the Lewisohn interests, developing the Cananea Nueva at the north of the district, the Pattison-Shattuck interests of Bisbee, with extensive ground holdings and several others of lesser importance which have work in progress and promise to immensely increase the proven mineral area of the camp, at the present time the biggest in the mining world.

"In other lines of industry in the last fiscal year the most important step was probably the beginning of construction of an immense meat packing plant which will utilize all the products of the beef and find market for its output largely in Sonora, Sinaloa and other states which Cananea will soon be in direct touch with through connections with the Guadalajara and other west coast lines of the Southern Pacific. The packing plant has a total floor space of 400,000 square feet. It is a re-inforced cement block structure of four stories in height and will cost with its equipment upward of $250,000. In general building in the city there have been business houses and dwellings erected in the last year to the value of more than a million dollars, including a fine new railroad depot.

"At this time a large force of graders are employed on a new line of railroad which will give the city direct connection with either Imuris or Nogales. It has not been made known yet whether expressed desire of the builders of the line, which belong to the Randolph system of the Southern Pacific, will be granted to the end that their connection will be changed from Imuris to Nogales. The desire for the change is in engineering difficulties which have been found in the survey to Imuris. Building from the Sierra Madres to the city is the lumber railroad of Col. W. C. Greene, which will bring the lumber from his mills at Madera direct to the mines and general trade of Cananea.

"Extensive sash and door mills at Madera and other enterprises using the lumber there available will be operated and will give Cananea close touch with source of inestimable supply. Building up the Yaqui river from the Guadalajara line, is the Southern Pacific. Another railroad for which survey is being made is a narrow guage from extensive timber tracts in the Ajos and in all it would appear that the city is destined within a very short time to become the great railroad center of the state of Sonora and northwestern Mexico."

Fluorspar: Its Output and Uses

The three principal classes of consumers of fluorspar are, in order of importance, smelters and metallurgists, makers of opalescent glass and enameled wares and chemical manufacturers, the various uses depending on its chemical composition, fluxing properties, phosphorescence when heated, and its optical and gem-like properties.

Chemically it is calcium fluoride, and consists of calcium and fluorine in the proportions of 51.1 to 48.9. The mineral is crystalline, only slightly harder than calcite, and crushes easily. In color it ranges, according to purity, from a clear, slightly bluish, glass-like substance through various brilliant shades, although much of it is white and opaque. It is usually very pure, the material marketed running from 98 per cent. to 99 per cent. of calcium fluoride, while material carrying less than 95 per cent. finds little sale.

Associated with other minerals, fluorspar has a broad distribution geographically and a wide range geologically. The deposits thus far exploited in the United States are, however, confined to five states—Arizona, Colorado, Illinois, Kentucky and Tennessee.

The total production of marketed fluorspar in 1906 is reported by the United States Geological Survey at 40,796 short tons, valued at $244,025. These totals are less than 1905, which surpassed all previous records in quantity and average value per ton. The decrease in 1906 was perhaps due to overproduction in 1905, resulting in surplus stocks which were sold in 1906, for at the close of 1906 the tendency of demand and prices was reported to be upward.

Considerable fluorspar is imported at the present time, but the market is practically limited to the Atlantic coast, as the cost of freight from English seaports to points west of New York tends to restrict the trade. English fluorspar has heretofore been cheap, at times selling at a price below the present cost of production, the shipments having been made from refuse dumps or abandoned lead mines, besides being brought to America as ballast, duty free. The local and the American demand will probably consume these English fluorspar mill-tailings within a few years, and thenceforth the material cannot be profitably exported to America, as the mines are closed.

Movements in Mining Camps of World

Only Authenticated Reports Will Be Admitted to These Columns

ARIZONA

Santa Cruz County—The Oro Blanco mining district in this county is located in the western end of the county not far from the Mexican border, and contains some very rich mines and prospects. The district is located about thirty miles west of the hustling border city of Nogales.

The Montana mine there belongs to Louis Zeckendorf of New York City. The work consists of a 150-foot shaft and a tunnel. They are also cross-cutting from the foot to the hanging wall, a distance of seventy feet. The entire ledge carries paying values in gold, silver and lead. The property is fitted out with a steam hoist, ten-stamp mill and cyanide plant. The mine in the main is a lead proposition.

The Gold-Boulder mine in this district belongs to Charles Hoff & Co., of Tucson. It is a good property and they are taking out paying values in gold, silver and copper. A shaft is down 200 feet and in sulphide ore.

The Oro Blanco mine has been sold to a Bethlehem, Pennsylvania, company. The shaft here is down 240 feet and a tunnel in about 200 feet. They are working a three-stamp mill and a steam hoisting plant. The vein is from six to ten feet wide, producing good values in free milling gold.

The Hon. J. B. Clannahan owns six claims here called the Clannahan group. He has recently been offered a large sum for this property, though he has very little work done. Enough development, however, has been done to indicate that it contains rich ore. On the Oro Blanco adjoining the Clannahan group $100 gold ore was recently struck.

The Wild property owned by William Wild, adjoins the above on the east. Considerable ore has been shipped from this property that run twelve ounces gold and 400 ounces silver. The vein is four feet wide, and the shaft is down 200 feet. This is no "wild cat" property.

The Golden Eagle group consists of seven claims. Six hundred feet of work has been done in shafts and tunnels. At a depth of eighty-five feet the ore values run $7.00 in gold with 100 feet to go to reach the hanging wall. This vein is said to be the largest gold vein in Arizona. It will average from $6 to $7, although there are rich streaks that will go as high as $3,000. Mr. J. T. McDonald has charge of the property.

The Rob Roy mine is on a thirty-foot vein and a mill test showed up $22 gold. The Rob Roy is a part of the Golden Eagle group.

There are many other mines and claims in this district of great value. There is plenty of wood and water and wagons and automobiles can go to the dumps of nearly every property without trouble.

The Oro Blanco, Patagonia and Nogales country is destined to be heard from by the mineral and financial world in the near future.

Maricopa County—The wonderful wealth of Arizona is more and more demonstrated almost daily in these modern times of expert mining. Where once the wild beast held sway and the Indians roamed, the modern mountain navigator is locating mines and capital is developing untold and unmeasured wealth.

In northwestern Maricopa the so-called Greenstone district is being opened up by a Los Angeles outfit and it is doubtful whether they know what they possess. They are on a mineral belt that sweeps across the country northwest and southeast. Copper is the prevailing metal. The company owns in all 120 claims, equivalent to 2,400 acres of mineral land. The Greenstone Copper Company proper have nine claims. Very little work thus far has been done. One shaft is down sixty feet and another twenty feet. In addition an open cross cut has been made to the east for fifty feet, all in ore. At the surface in nearly every one of these claims high grade copper ore is found marked with copper glance. At the bottom of the sixty foot shaft the ore taken out runs very high in the red metal, an astonishingly high percentage, besides some gold and silver. The company intends to thoroughly develop all the property. Copper seems to be everywhere.

The Greenstone country is located about northeast of the Harqua-Hala mountains in the foot hills, and perhaps forty miles easterly from Wickenburg. Aside from the Greenstone, the company owns six other groups in the neighborhood, which are included in the 120 claims mentioned. Wood is plenty and water enough is available for mining purposes. With depth the ore will, as it does elsewhere in the copper belt, turn to sulphide.

The country rock is varied and includes granite, lime, porphyry. The granite is evidently a secondary formation. The vein capping is iron. The shaft (principal one) is on the foot wall of an enormous vein and all the ore thus far taken out is rich in copper. No man can tell what greater depth will show; but certain it is that the values thus far taken out make the heads of the old timers spin like a top.

The president of the Greenstone Copper Company is Mr. F. H. Kline, an experienced mining man. Mr. J. E. Ward, an ex-Californian banker, is secretary and treasurer.

This section of the country will bear watching by those interested in copper mining. If the red metal continues to show itself with depth, the same as it does in the meager workings mentioned, Arizona will soon have another big copper mine to add to her already long and high grade list. The Greenstone company's property looks like a bonanza.

Cochise County.—Calumet and Arizona people are pushing work with usual energy. Magazine Copper Company at Johnson, has been making steady shipments of ore, with ten men busily employed.—The Black Prince Company and the A. & M. D. Company are erecting new buildings, while several other companies are making preparations for extensive development work.—One hundred miners and engineers have been layed off by the Tombstone Consolidated, while the Tribute, Tranqhility, and Silver Thread properties have been shut down. Three mines only are at present working in this town, viz., the Boom, the Emerald and the Lucky Cuss.—The Calumet & Arizona people have purchased five claims formerly owned by Costell and Alex Casey in the Dragoon district, for the sum of $150,000.—After two weeks inactivity pending the retimbering of the shaft and addition of new machinery, the North Bisbee mine has resumed its work of sinking the shaft and driving the tunnel with a full complement of men.

Pima County.—The Tucson Consolidated Company has suspended operations on its Black Dyke group of claims. On the Purcell group forty men are sinking shafts and driving tunnels in a seven-foot vein of silver-lead ore assaying seventeen per cent. lead and twelve ounces silver.—A deal, in which Col. Epes Randolph and his associates have acquired three groups of mines in the Catalina mountains, viz: The Leatherwood group of nine claims, the Stratton group of eleven claims and the

Giesman group of five claims, is practically concluded, the consideration involved being estimated at about $200,000. The extra importance attached to this transaction rests on the fact that it may lead to the construction of a Randolph branch line from Benson.—J. Gordon Hardy, a mining engineer of New York City, and C. S. Ridgway, a mining expert of Denver, have been examining the property of the Oxide Copper Company in the Silver Bell district, for the purpose of making a report to the directors in Boston, who contemplate extensive development of their property.

Pinal County.—The Sultana-Arizona Copper Company are probing new bodies of ore in their extensive holdings at Kelvin, small shipments being made each month.

Yuma County.—The King of Arizona Mining Company has a force of 150 men engaged in production and development, besides fifty more freighting and handling wood. Its deepest shaft is 1,000 feet below the apex of the mountain and its main tunnel has been driven about 200 feet. One hundred and ninety tons of gold-bearing ore are being handled daily by its dry crusher and being cyanided and smelted on the ground.

COLORADO

Boulder County. — The Baltimore Belle mine, on Overland Hill, has been leased to J. A. Reynolds of Chicago and Jonah E. Hill of Jamestown, and will be worked for all the ores in it.—Manager S. B. Leonard of the Cash mine reports the latter to be supplying the mill at its full capacity.—The Modoc mine has resumed its operations, the suspension of work for several months being caused by the installation of new machinery in the mill, which, with thirty stamps, will handle about sixty tons of ore per day.—The Columbia Lode Mining Company is erecting a hoisting plant over the old Baxter shaft. The Sullivan No. 5, formerly operated by this company, will be turned over to its leasers, who will soon begin work upon it.—A new amalgamating and concentrating mill is soon to be installed for the Morning Star, which has been developed over 330 feet.

Chaffee County. — The group of claims belonging to Ed Logan and now being worked, have an exceptionally fine surface showing.—The Independence mine, near Turret, may be temporarily closed down on account of the smelter bins being full. The size and quality of its ore is much improved.—The Gold Bug mine of Turret has encountered considerable black talc and sulphides.

Clear Creek County.—The Honest John Mining, Milling & Tunnel Company, with a bore of 2,400 feet into Saxon mountain, on upper Clear Creek, plans a pipe line from Chicago Creek with a length of 2,800 feet, to supply electric power for the mines of this company.—Byers & Co., who are leasing on the Zero level of the Dives-Pelican and Seven-Thirty Mining Company, sold a load of ore lately that returned 252 ounces in silver.—B. J. O'Connell, leasing on the Frostberg, made a shipment of 100 tons of lead and zinc ores to the Newton mill at Idaho Springs.—The Shively crosscut is advancing three feet per day and is now within 175 feet of the Shively vein.—The Democratic Mountain Mining Company is making heavy shipments of ores running sixty per cent. lead, besides fair silver values.—The Nashotah concentrating mill is being overhauled and repaired preparatory to the winter work.—The Pelican mill, belonging to the Dives-Pelican and Seven-Thirty Company, has been leased and will be remodeled with a 300-ton capacity.—The Burleigh Mining & Leasing Company is connecting the west Phillips drift with the Seven-Thirty shaft.—The building for the new fifty-ton mill of the Linn Consolidated Mining & Milling Company is being constructed as rapidly as possible, since the machinery is ready for shipment.—Leopold Sternberger of Denver was examining his holdings on Upper Fall river recently.

El Paso County.—James Burns of Colorado Springs, and associates, will construct a big reduction plant to cost about $750,000 near Colorado City to compete with the mill trust and the Portland company for the handling of Cripple Creek ores.

Dolores County.—In the preceding week five strikes were made by the United Rico Mines Company, viz., Shamrock, lead-zinc; Potter, copper; Atlantic Cable, lead-zinc; Soda Street, lead-zinc; Ute, lead-zinc, with good silver values.

Gilpin County.—Henry P. Lowe and Tyson S. Dines of Denver will renew the old Topeka mine, in Russell district, on an extensive scale.—The Pearl Tatum Mining Company, owning the Sleepy Hollow mine, has added a night shift to its working force, and has ordered a 100-horsepower boiler from Stroehle & Sons of Black Hawk and a sixteen-drill compressor of the Sullivan type. Rich ores are being shipped to the mills, with a prospect of further development work to be carried on.—The Almaden company is progressing steadily with its upraise between the Blazing Star tunnel of the company and the old shaft above, only 100 feet remaining to complete the connection. L. F. Tobias of Idaho Springs is developing the Bavaria-Queen property, near Black Hawk, and has interested several Illinois men in the mine.

Grand County.—A sixty-foot wide body of ore has been uncovered on the property of the Consolidated Mining, Milling & Smelting Company, operating the old Fourth of July mine, near Arapahoe Peak.

Lake County.—The Wellington Association has a group of claims situated in Lackawanna gulch, Twin Lakes mining district, which contains highly mineralized free milling quartz in large quantities and which will be actively developed in the ensuing months. The company will establish a large stamp mill on this ground.—The renewal of operations at Fryer Hill is making much progress with the recently developed market for low-grade silicious ores.—John Soder and associates, leasing on the Eclipse property in Empire gulch, have run their crosscut tunnel a distance of fifty feet.—The Hurm property, financed by Indianapolis capitalists, is being steadily operated and promises paying dividends.—The Emerald tunnel, near Chalk ranch, in over 400 feet, will be pushed all winter, in the endeavor to locate a rich vein that is thought to be covered up.—The Dinero tunnel, on Sugar Loaf mountain, is making good progress, being now 1,000 feet in the mountain.—The Greenback management is having its battery of six boilers examined and overhauled, to be in readiness for the new pump which is to be installed at the 900-foot level.—A. Wallace and L. E. Jorstad, who have secured a lease on the old Seneca shaft, are extracting from the 300-foot level a carload of ore a week, that assays from seven to ten ounces of silver and forty to fifty per cent. iron.—The Mammoth mine recently sent in to Leadville two handsome lumps of ore, one being almost solid steel galena and the other yielding 500 ounces of silver.—The Elva Elma is making steady gains and shipping occasional cars of good grade ore.—Shipments of twenty to twenty-five tons daily of carbonate ores are being made by the La Plata mine, on Rock Hill, leased to William Bowden.—The Arkansas Valley smelter, having completed a number of necessary improvements, is treating about 1,000 tons of ore a day.

Ouray County.—The San Antonio mine has been shipping five cars of copper and lead ore weekly to the Durango smelter, two cars yielding a

value of $950 and $550, respectively.—The strike on the Chipeta tunnel proves to be a carbonate whose exhaustion is not in sight.—The Lloyd group of claims, near the Camp Bird mills, consisting of 8,000 feet along a six to sixty foot quartz lead of free milling gold that assays $20 to the ton, will be extensively developed and promises high returns to its operators.—The purchase of the St. Paul mine, in the Red mountain district, operated by Hon. George Walker, is being negotiated.—The Grizzly Bear sent to the Salida smelter a car of silver, lead, copper and gold concentrates that yielded $100 to the ton.—Damage to the extent of $20,000 and fifty men thrown out of employment for the winter, was the result of a fire at the Mayflower mine, Telluride.—A remarkably rich strike is reported to have been made on the fifth level of the Camp Bird mine.—Twenty-five lode claims, representing the entire property known as the Poughkeepsie gold strike, have been purchased by eastern capitalists and, encouraged by sufficient surface work, the purchasers will prosecute further development.—A car of 17.8 tons of ore, showing twenty-six per cent. copper and fifteen ounces silver, shipped from the Iron City group in Corkscrew gulch, netted $995, being one of several almost as good.—A mill will be put up next summer on the San Pedro property, if the drifts on the vein pay as they promise.—Excavations have been made for the new addition to the Atlas mill, increasing its capacity by thirty stamps.—The Mineral Farm is making rapid advances with the advent of its new power drills.

San Juan County.—In spite of an interruption of a three days' labor celebration, Silverton mined, milled and marketed, during the month of September, 25,000 tons of ore.—A. A. Brown and A. Marshall, leasing the Old Abe mine, have exposed a four-foot streak of ore, two feet of which will yield $200 to $300 per ton in gold and silver.—The Shenandoah-Dives Leasing Company will increase its working force as soon as power can be transmitted from the Animas power line, with which to operate its new compressing machinery.

San Miguel County.—The Silver Pick mine, in the Mount Wilson district, is being revived and re-equipped, with thirty men at work.—It is said that P. P. Steinwandle and Henry Williams are negotiating for reduction works on their six claims of lead, zinc and copper in Navajo basin.—W. Carr and J. A. Johnson have made appreciable advancement on their properties, which augurs well for next spring's campaign.

Summit County.—Several well-known Leadville men have been inspecting the Arnold group, on Elk mountain, with a view to taking out a lease.—The Reconstruction group, near Kokomo, has opened up some excellent ore bodies.—The Kimberly-Wilfley and Breene groups, on Elk mountain, are steadily sending out good ore and concentrates.—The International mine promises, from its present production, big returns for its investors.—The Gold Union is to have its 450-foot shaft sunk 250 feet deeper.—Three hundred feet of pipe have been bought for a power line to operate the Silver King mill at Montezuma.—Officials of the Summit County Power Company have been witnessing the completion of the immense power plant of the company at Dillon.

Teller County.—One dollar and sixty cents per ton ore is netting the Homestake company of Cripple Creek a monthly profit of $10,000, through economical milling.

MEXICO

Chihuahua.—The Batopilas Mining Company reports its output for the week ending September 14th to be 11,000 ounces of silver.—The new tram of the last named company crossing the river and delivering ore from the San Miguel mine to the stamp mill at San Antonio, is completed and carries 100 tons daily.—The Santa Eulalia and Potosi have been curtailing shipments on account of the decline in zinc.—From the property of Othon Sartorius 400 tons of low grade zinc ore have been shipped to Wisconsin to be used in paint manufacture.—New hoisting apparatus is soon to be installed in the San Toy mine in which Charles M. Schwab and other New Yorkers are heavily interested. A shipment of 1,500 tons daily is expected to be made by the end of this month, each shipment netting $32,000.—Low spirits prevail in Parral, owing to the unfavorable metal market.—An inspection visit of J. A. Coram of Boston, president of the Mexican Consolidated Mining and Smelting Company, together with other Easterners interested in the company's holdings at Guanacevi, indicates more machinery and equipment for that property.—The Palmilla mine, owned by Don Pedro Alvarado, has been leased for fifteen years to a Boston syndicate headed by Messrs. Coram, Heinze and Beckman,—The Palmar Mining Company is shortly to install two new electric hoists, power being supplied by the Parral Power and Reduction Company.—N. P. Wilson is putting a thirty-five horse-power electric hoist on the Ricamole property.

Oaxaca—Great excitement was aroused by a rich copper strike by William Waters in Ejutla.—The plant at Magdalena will have its capacity increased 100 tons daily by the completion of the new furnaces. The Magdalena lead mines will furnish the necessary flux for the smelter.—At the Veronica mine in Taviche, ore running as high as thirty kilos silver and one kilo gold to the ton, has been struck at about 250 feet.—The Zavaleta mine has met with ore assaying $30.75 in gold, $15.39 in silver, and 13.7 per cent. in copper. The mill at Zavaleta will be ready for receiving ore in a few days.

San Luis Potosi—The Republican Mining and Metal Company is beginning to operate at its mines at Wadley a Westinghouse two-cylinder, 13x12 inch gas engine.

Sonora—The Greene-Cananea Company has been decreasing its production considerably owing to the dull demand for copper.—The Phelps-Dodge Indiana Sonora Company is realizing encouraging progress with its third limestone tunnel in the Sierra de Cobre property.—The Democrata Mining Company has made a strike on the fourth floor of its main tunnel. Its Ortega property continues to show excellent values in gold, silver and copper.

Great progress is being made in all departments of this popular industry. The most improved machinery from the United States is going into her mines, mills, smelters, tramways, electric plants and other contingents.

The Mexican Herald states that General Manager Moorehouse of the Mexico Consolidated Mining and Smelting Company has been placed in charge of the properties recently leased by Boston capitalists from Senor Alvarado, known as the Alvarado mines and located in Parral, Chihuahua. Plans are being laid for the installation of modern machinery which is expected to greatly increase the output of the mines.

It is stated that two companies will be organized as soon as the necessary details have been arranged. One will be organized under the laws of Mexico and a holding company under the laws of Maine to operate the mines with headquarters in Boston.

A fifteen year lease has been secured and the terms, as now reported, are a cash payment of $100,000, gold, to be paid immediately to Alvarado, and a loan of $300,000 at seven per

cent per annum. The lessees are to have fifty-five per cent of the profits and the balance to go to Alvarado, but out of which the $300,000 is to be paid in installments.

One of these companies that has gained considerable prominence in the local shares market during the past few months, is La Compania Minera El Rey, the stock of which for the greater part is held by Monterey capitalists.

Mine El Rey is located in one of the richest mineral districts in the state of Tamaulipas, only about six leagues distant from the capital of that state, Victoria, which is located in the Tampico branch of the Mexican Central railroad.

Much development work has been done on this property, and while it was at first worked for zinc, since the slump in the price of that metal, work is being prosecuted with the special view of producing lead and silver, large quantities of which are said to be in sight.

Guanajuato—The shaft of the Humbouldt mine at Guanajuato is progressing at a rapid rate. The shaft is at present down about eighty meters, but the work is being handicapped by lack of blowers in the shaft. The men are forced to lose considerable time after each shot to wait for the air to clear before going to work again. Blowers have been ordered and they are at present on the ground and will be installed within the next few days. The men in charge of the work expect to strike the Pinguico Carmen vein of ore within a comparatively short time.

An old group of mines that is attracting considerable attention at the present time under its new ownership and management, is the Jesus Maria owned by the Guanajuato Amalgamated Gold Mines Company, and now being managed by Lorenzo Adams, of New York, and situated in the La Luz district. Good ore has been encountered, the vein being five feet wide and assaying sixty-five grams gold. This confirms the claim that the veins of the district increase in gold values with depth. This vein is but one of several rich veins found on the property and is a vein that had never before been discovered. This property is located in the famous La Luz district, which is again coming to the front as a great producer of gold and silver, after its long sleep. American capital and industry are fast bringing the La Luz district to the front once more by opening up and successfully working many mines that for years past were considered of little value.

In this district there have also been many surprises, among those who have bought several old properties chiefly for the probable values contained in the dumps.

Work is going ahead on the Humboldt mine, since the hoists have been installed under the direction of A. J. Bean and Son, making an average of five and six-tenths meters per week on two shafts. It is stated that in about sixteen meters more the workmen will be driving basements to the different veins. There are a number of reléases crossing the shafts, giving indication of changing ground and vein matter. The company will install fan blowers this week, which will be a great benefit, as there is said to be a great deal of gas to hinder the work at present.

Dr. Busby, of Mexico City, came in from his mine, the Edward VII., and reports cutting the vein, which looks very promising.

The Guanajuato Reduction and Mines Company, owner of the great Valenciana group, have more than one hundred stamps at work in their mill and cyanide plant. They expect to have forty more stamps dropping next month. The company has recently found ore of much higher grade than was expected.

Conception Del Oro—W. H. Banks, general manager of the General Escobedo mine in the famous Conception del district in the state of Zacate cas, states that he has struck another vein in the old shaft, but that he has as yet been unable to tell just what it measured. The new shaft is down sixty feet, while the tunnel being driven from the side of the mountain has already gone in 100 feet. The property has twenty-two veins, eighteen of which are said to be well defined. Shipments will begin next week, after which it is expected that several carloads of rich ore will arrive here every week.

New Plant for Borda Antigua.—A large amount of electrical machinery has just been received by the Compania Minera Borda Antigua y Anexas to be used in equipping their mine and mill throughout. The main hoist at the mine, which is the Lidgerwood make, is being fitted with a 150-horsepower Westinghouse hoist motor and a number of eelctrical pumps are being installed in the mine. A fifty-horse power motor will be used to drive the stamps in the new mill, and a seventy-five horsepower motor on the tube mill, and a large number of smaller motors will be required for operating the crushers, pumps, etc., in connection with the milling work and for the blowers, machine shops, etc. In all there will be 400 to 500 horsepower of motors installed, together with the usual equipment of transformers, switchboards, lighting apparatus, etc.

With this installation the Westinghouse Electric and Manufacturing Company, through their Mexican agents, G. and O. Braniff and Company, will have placed in the El Oro camp approximately 12,000 horsepower of electrical apparatus, the greater part of which has been operated for about a year and a half.

NEVADA

Churchill County.—The Nevada wonder, at a depth of 500 feet, is to crosscut four ledges of exceptionally fine surface showing.

Esmeralda County.—Five leases have been taken out in the vicinity of Stimler.—The thirty-foot shaft of the Nevada Consolidated Mining Company shows three feet of ore that averages $100.

Lander County.—Samples of copper from a strike on Willow creek assayed sixty per cent. of that metal, which was taken out of the Patton claim in the native state.

Washoe County.—The Ruby Silver Leasing Company is extracting high-grade ore from the Balloon.—The Rawhide Mining & Leasing Company has met with three feet of ore running $165.25 to the ton.—The Wilmore and Lind lease, adjoining the Rawhide and Truitt claims, have five feet of gold and silver ore that assays $227 a ton.—The Truitt lease on the Roseberry has struck ore at a ten-foot depth running $6,000 to the ton in gold.—A consolidation of properties in which C. Grutt & Co., Daily, Hard and others are interested, is being negotiated.—The ore of the Rawhide is all of high grade, being a quartz and porphyry matrix that holds black tellurides and free gold.

NEW MEXICO

Santa Fe County.—The Santa Fe Gold & Copper Mining Company has laid off 350 men and it is reported that work will be suspended until next spring.

Socorro County.—The Graphic Company, in the Magdalena district, is shipping a large tonnage of lead and zinc carbonates to the Deming smelter and to the company's plant at Joplin, Missouri.—The Tri-Bullion Company has installed new machinery and mill at the Kelly mine.—The Mine Development Company has completed its mile-long tunnel connecting the Tip Top with the Key workings, making it the longest tunnel in the district. It has also constructed a fine wagon road between Kelly and the mine, facilitating the shipment of its increasing ore output.

SOUTH DAKOTA

Custer County.—In the Deep Down property, at Keystone, an eighteen-inch vein of free milling ore has been uncovered, which runs up to the highest values ever reached in this state. —The Saginaw Gold Mining Company, having made extensive repairs, is ordering a new 1,000-foot hoist.—The Ivanhoe Gold Mining & Milling Company, with 250 acres in Custer county, has ordered a fifty-ton Chilean mill from the Downie-Wright Company of Rapid City, and a fifty-ton cyanide plant from Olympia, Washington, which will be in operation before winter sets in.

Lawrence County.—The repairs on the Esmeralda mill, at Blacktail, are almost finished.—The Mariposa Mining Company has struck a twelve-foot ledge of ore averaging $4 per ton in gold.—The La France Copper Company is erecting a new zinc plant at the Lexington mine, which will treat 200 tons of ore daily by the process of dry concentration.—The Reliance Mining Company has placed orders for a set of air drills to arrive within the next sixty days.—The mill of the Globe company will resume operations as soon as wired to the plant of the Redwater Power Company.—The main shaft of the Gold Queen is now down 216 feet, following a blue quartz vertical vein of good milling grade.

The Golden Reward Company, with Tom Keene in charge, has resumed work on the Harmony lode, with good ore in sight. The Gilt Edge Maid mine is to begin development of a 300 foot low grade ore body averaging $2 per ton in gold. Its dry crushing mill has now a capacity of 300 tons, which will be operated at its full capacity.—The Clinton and Portland companies are making rapid headway on their holdings in the Bald mountain district. They expect to ship to the Lundenberg, Dorr and Wilson mill all that the plant can accommodate.—After a six months suspension, due to its fire, the Homestake company is ready to continue operations. J. R. Phelan, of Alliance, has secured entire control of the Gold Deposit mine, which he will work in conjunction with his other property, the Horseshoe Comet, near Galena.

Pennington County.—H. D. Dibble of Mystic, is in Rapid City, superintending the construction of his new slime filter at he Downie-Wright factory. The filter, of 100 capacity, is to be installed in the Golden Reward mill in the first ward. He is building another set of filters for the American Eagle.

Mr. Simpson was for nine years connected with the Homestake company and got his schooling in mining under some of the most expert men that have been connected with that company.

The Pioneer Times says: The distribution, among the other camps, of the three thousand miners laid off in Butte on account of the curtailment of the copper product, will be a good thing for the other camps, but the number won't go very far towards supplying the demand for miners. All the gold, copper, silver and coal camps of the West need more miners and laborers. A few years ago the throwing out of employment that number of men at the beginning of winter would have been serious. Now it is just a question of a short trip by rail to find employment. Those who were laid off are said to be mostly single men who can make the move with little expense or inconvenience. Perhaps the Hills will get back some of the good miners who left the early part of the year.

There are many gigantic enterprises under way in the world and it is quite as difficult to find the muscle to complete them as the money to finance them. They are outside of the ordinary fields of employment for labor, such as the field, the mill and the mine. These must all have their workers, and the great affairs must depend upon the surplus labor. The Panama canal calls for 40,000 men; New York City has a $60,000,000 water supply job on hand, and the state will spend $101,000,000 more on a large canal. Railway extensions on a vast scale include England's Cape to Cairo road in Africa, the double-tracking of the Trans-Siberian railroad, and 6,000 miles of new track in Canada to cost $30,000,000 and furnish work for 60,000 laborers. And these are only a few of many enterprises making a demand for toilers. Some of them at least cannot fail to be delayed in completion until the multitude of hands required are provided.

Rochford.—The Golden West Mining Company near Rochford is operating at reduced capacity at present owing to the fact that some of their machinery is out of commission. One of the Chillian mills met with an accident which resulted in a broken die and it has been suspended pending the arrival of repairs. This has reduced the daily capacity to about twenty-five tons, but the other mill will be working before the end of the present week and the usual sixty tons of rock will again be going through.

The company have the saw mill in operation and are turning out lumber to be used in the mill of large capacity which they are contemplating erecting. No definite time has been set for commencing this new building, but they will probably get at it early next spring.

The Bonanza Mountain Mining and Milling Company are planning extensive improvements on their property for patent, have charge of a number of claims on which considerable prospecting has been done on the surface and a shaft has just been sunk a distance of fifty feet. Cameron & Cox, mining engineers of Rhyolite, who have surveyed the property for patent, have charge of the development work. A large contract for sinking will be let this fall, when it is expected a large gasoline hoist will arrive and a new gallows frame will be erected on the property for further sinking. The property is controlled by Denver and Eastern parties.

Rapid City — The Downie-Wright Company secured an order Saturday from the Continental Copper Mining and Smelting Company, for a complete hoisting plant, including sheaves, cages and hoist. The engine will be a double Corliss of 250-horse power, and the hoist will be second motion, reversible, with double reel, each reel to have a capacity of hoisting 1,000 feet and a lifting capacity of 8,000 pounds. The complete machine will weigh 42,000 pounds. The contract calls for a first-class outfit in every respect. This is a large hoist and everyone is glad to notice the prosperity of the mine which calls for a machine of this size.

The plans were made by the Downie-Wright Manufacturing Company and Mr. Downie informs us that everything pertaining to this plant will be made here in Rapid City. This city should congratulate itself upon a plant capable of turning out machinery of this magnitude.

Cobalt—Owing to the approaching completion of the 100-stamp mill of the Cobalt Central Mines Company, which will be ready for operation in October, the management of the company has been storing its ore in bins for several weeks with the result that a large supply is on hand to start concentrating when the new mill is ready. Up to a few months ago the company was shipping custom ores but with its own concentrator the efficiency of the mill will be increased more than fifty per cent.

Engineers who have been examining the Gamey mine of the Cobalt Central report that the rich veins of the Coniagas mine, next adjoining the Gamey, run right through the latter property. As the Coniagas generally is considered one of the richest forty-acre blocks in the Cobalt camp the outlook for the Cobalt Central's Gamey is promising.

Anse Tippie is in from Yellow creek and the Grizzly gulch. Anse has a group of claims on the Grizzly divide that has been attracting considerable attention of late, and which also shows ore bodies which would mean a big fortune in other places. He has all of his ground well developed, and all of it in such a condition that a mining man may, at a glance, see what is in it for the opportunities which it offers. He has done all of the work on it himself, without assistance from other people, and believes that he has one of the best propositions in the Black Hills. His ground is located just about one mile and a half southeast of the Ellison hoist.

How few people know that oil is not a product of coal. It is true that oil and coal are sometimes found together or at slightly different depths in the borings, but this is because sands, conglomerates and other porous rocks hold the oil as a sponge would. The oil is the result of the chemical action of hot sulphurous gases on carbonates and salts dissolved in water. Therefore the rock in which oil is found has little to do with the origin of oil.

It is a known fact that these sulphurous gases are seldom found except where the earth's surface is broken as in uplifts like the Black Hills. The Englewood and Deadwood limestones, which are really calcareous sandstones and which lie on the igneous formations, contain the salts which with water under great pressure, make conditions ideal for the formation of asphaltum oils. There are also several other strata above, which contain this salt and sulphides of iron, which help to produce sulphur gases when broken up by heat and pressure, between the igneous rock and the red beds. Among these strata are beds of porous rock to sponge the oil.

As stated above, oil is generally found around an uplift and being chemically formed is forming very slowly, but all the time and must have a receptacle. Nature has made these in various ways that resemble the wrinkles in a blanket. These wrinkles or synclines and anticlines exist in most oil fields although erosion makes the surface plain.

As oil floats on water and natural gas is the vapor of oil, the three may be the product of neighboring wells reaching the same strata. Thus one well is not always a test.

The Rochford-Wyoming Oil Company conducted their work in the lower Spearfish red beds, drilling through the Minnesota limestone and Opeche red beds into the Minnesota where they found the best of indications. The oil produced from No. 1 well shows that it is stray oil which has escaped from below. The showing, although good, would have been much better had it not been for the fresh water which troubled from the first, having come in just under the Minnesota limestone and which is bad in an oil well. But water can easily be handled with the proper appliances. Having located the water-bearing strata, it will be controlled in future work.

WYOMING

Oct. 16.—Reports from Lander, of a recent date, represent the mines in the vicinity of the South Pass district as in a prosperous condition and steadily growing better. The Leader says although no actual values have been shipped the amount of work done speaks well for that part of the state. James A. McCoy makes the following statement in relation to the mining interests of that district:

The contract for the Edwards tunnel and all work to be done this fall on the Edwards-Greenaugh placer property has been let, and active development work is now commenced. The company is advertising for men at $3 per day. Steady work all winter.

The work on the Beaver placer mine, consisting of a ditch three miles long and all buildings for the company, will be completed in three weeks. The pipe for hydraulic mining is expected to arrive at any time. No mining will be done this winter but the company aims to get ready for early work next spring.

The Miners Delight, of which Senator Clark is a member of the company, is working a crew of about thirty men. They are taking out ore that they are sacking. They are repairing the old mill and will probably make a run late in the fall.

The Burton & McGrath mine has recently made a 100-ton run at the Neff mill about two miles distant and the results have been entirely satisfactory. This mine has two shafts 100 feet deep where they have struck water and stopped development, as they have no pumping machinery. No ore has ever been taken out of this mine except in sinking, drifting and cross-cutting, and a cross-cut at a fifty-foot level has developed forty feet of ore, two assay samples of which recently gave returns of $2.50 and $59 a ton.

In addition to the 180-foot cross-cut south at the bottom of the 400-foot shaft of the Carissa, a cross-cut has recently been run forty feet north in $8 to $30 ore, and no wall yet. This gives the Carissa 220 feet of ore with no wall yet.

Some remarkably good assays are being secured from the copper belt north of South Pass, and Charles Swanson of Rock Springs has resumed work on the Riniker mine on Gold creek, intending to go down 100 feet below water line, where work was abandoned some time ago. This mine has 200 feet of ore on the surface and a sixty-foot crosscut at the sixty-foot level is in ore all the way.

The Sweetwater placers are under option and there may be considerable development work done this fall.

The machinery has been installed in the McKay mine at Lewiston and the water has been pumped out and sinking is progressing steadily on a two-foot vein of high grade gold ore, a carload of which netted $90 a ton at Salt Lake City two years ago.

The Bulletin mine is also pumped out for the first time in five years and large bodies of medium grade ore were found. These two properties, with several adjoining claims, are under option to Duluth, Minnesota, people, who will probably take the options up in the near future. These properties were both recently examined by R. N. Dickman of the Rookery, Chicago, and his report, which is not public, will no doubt be highly satisfactory to the contemplated purchasers. They are spending considerable money on their options in the way of pumping machinery. Twenty men are now employed.

Development is progressing favorably on the Bluebird.

The MacFarland copper property on Willow creek is looming up. They are down 160 feet in sulphide ore that is reported to run forty ounces in silver, with about $10 in gold and copper to the ton. No leveling or crosscutting is being done on this lead to date. A pump and hoisting plant have been ordered and is expected to arrive soon.

Good assays in copper are being secured on a number of ten-foot holes on the east extension of this claim.

Some time ago the United Rico mines Company, at Rico, began the concentration of the vast dump and other low-grade material of the company's properties. The mill product returns about $70 to $75 a ton, but Murray Lee, who is in charge, expects to run the concentrates up to $100 a ton in a short time. At present he is handling about twenty tons of material per day, which will be continuously increased until 500 tons per day are disposed of. There are about 750,000 tons of ore on the Group Tunnel dump and about 250,000 tons of stope dirt, all of which will pay to concentrate. The concentrates will be shipped to Durango or Salida.

PERSONALS

Geo. F. Willig, a prominent mining man of Prescott, Arizona, is on the coast on pleasure and business.

Russell Mason, manager of the De Soto Mining Company, of Middleton, Arizona, has been making a visit to Colorado points.

Howard Carpenter, manager of the Enterprise property at Eldora, Colorado, has returned from a business visit to the east.

June Wilson of the Teziutlan Copper Company, of Vera Cruz, Mexico, has been making a visit to Boulder county, Colorado.

Lucius W. Mayer of New York, will be absent in Europe for two months in the interest of the American Smelters Securities Company.

George W. Heintz, traffic manager of the United States Smelting, Refining and Mining Company, is in California on company business.

N. C. Bonnevie, consulting mining engineer of Denver, Colorado, was a recent visitor in New York. He returned to Denver last week.

F. C. Lincoln of New York City, has been appointed professor of geology and mineralogy in the Montana State School of Mines at Butte, Montana.

George W. Teal of Boulder, Colorado, has returned from a trip to examine mines near Salmon City, Idaho, in the interests of eastern investors.

Philip Argall, consulting mining engineer of Denver, Colorado, who has been examining mines at Magdalena, New Mexico, has returned to Denver.

Frank Gill of Globe, Arizona, well known in mining circles as an old timer in copper mining, is spending a well earned vacation in Los Angeles.

J. C. Fleschhutz, manager of the Pewabic Consolidated Mines Company, operating near Central City, Colorado, is making a two weeks' business trip to eastern points.

Murray Arnold Hines, Ph.D., of the Mallinckrodt Chemical Works of St. Louis, has been appointed assistant professor of chemistry in Northwestern University.

Samuel Newhouse spent several months of the summer in Europe. He returned to New York in September and is now visiting his mining interests in the West.

Victor G. Hills of Denver, has gone to Guanajuato, Mexico, to examine mines in that vicinity for an American and English syndicate. He will be absent thirty days.

R. A. F. Penrose of Philadelphia, Pennsylvania, who has been spending some time in Chile, has arrived in London on his way home and is expected to reach New York shortly.

Captain H. I. Scamann of Denver, manager of the Continental Mines, Power and Reduction Company, operating in Clear Creek county, has gone east on a business visit for several weeks.

Richard Linthicum of the Rico News, has gone to Chicago, New York and other eastern points in the interest of the Rico Consolidated Mines Company. He is expected to be absent several weeks.

W. R. Rathvon, manager of the Inland Oil Company, Boulder, Colorado, was in the East a short time ago and while absent purchased at Lodi, Ohio, a 500 barrel per day refining plant for the Boulder works.

J. F. Lewis of New York City, and James McAdam of New Haven, Connecticut, were in charge of a party who traveled in a special car from New York City to Gilpin county, Colorado, to examine the groups of mines owned and operated by the Fifty Gold Mines Corporation.

F. R. Hall, a well known mining engineer, formerly connected with the Liberty Bell mine near Telluride, and later in charge of a mine for an American syndicate at Honolulu, has accepted the position as engineer for the United Rico Consolidated Mines Company at Rico, Dolores county.

Louis M. Richard, mining engineer, who has recently been with the Steptoe Valley Smelting and Mining Company at McGill, Nevada, as assistant engineer in charge of office work on construction, has been elected to the chair of mining engineering at the North Georgia Agricultural College, at Dahlonega, Georgia.

Charles Russell of Prescott, Arizona, is heading an expedition, the objects and purposes of which are to make a study of the economical geology of the Grand Canon of the Colorado river. His expedition will leave Green River, Utah, about September 18th, and is expected to spend eight or nine months in making a prospecting trip.

J. P. Karns, the inventor of the Karns tunnel drilling machine, is again back in the state after perfecting and manufacturing several of the great machines at the works in Cleveland, Ohio. Mr. Karns says they are now putting them on the market and several will be installed and in operation in the next six months.

Elmer King of Denver, who made a fortune out of the Henrietta mine in San Juan county, has gone to Kansas City, where he will spend the winter. Mr. King discovered the Henrietta mine, did the preliminary development and finally sold out for a handsome sum. He yet has valuable mining property in the San Juan and will return in the spring.

David Swickhimer, a prominent mining man of Rico, returned last week from an eastern trip and immediately proceeded to his mining interests in Rico and other points in the San Juan. He says the Rico district is gradually improving, and capital is taking hold over there with more confidence than usual. Dolores county offers splendid opportunities for judicious investment.

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MINE ACCIDENTS FROM SHOT FIRING.

During the year 1906 there were 282 accidents in mines in Great Britain and Ireland due to the explosives used. In these accidents there were forty-two lives lost and 318 injuries. Nineteen of the accidents were caused by premature explosions, twenty-six by not taking proper cover and twenty-eight by hang-fires and returning too soon. Seven accidents were due to the firing of charges by electricity while men were still at the shot hole. Forty-three took place during stemming or ramming. Boring and tampering with miss-fire shots and boring into unexploded charges accounted for thirty-one accidents, and striking unexploded charges during the removal of debris caused twenty-seven accidents. Seventy accidents had their origin in the accidental contact of sparks or flame with explosives, but none of these had a fatal result.

THE STOCK AND METAL MARKETS

Colorado Springs

Oct. 16.—Much speculation is being indulged in by those interested in the market, as regards the dullness in mines, prospects, etc., as the properties are producing more and even better than they did when great interest was manifested in the mining stock market. One reason is advanced that much money is being invested in other enterprises, and for this reason people are holding their money from the mining markets. This may be the case, but if it is, there will soon be a reaction from the dull market and the exchange may again be the scene of the busy days of old.

The exchange opened with no interest whatever, and on Wednesday the situation was very little improved. Following are the quotations:

Mines.

Stock.	Bid.
Acacia	06⅜
Black B.	....
C. C. Con.	04⅛
C. K. & N.	05
Dante	05⅛
Dr. Jack Pot	06
Elkton	48
El Paso	35
Fanny Rawlins	05½
Gold Dollar	06½
Gold Sovereign	03⅜
Index	02
Isabella	23
Jack Pot	03½
Last Dollar	02
Lexington	....
Mary Cashen	....
Mary McKinney	....
Mollie Gibson	....
Moon A.	02
Old Gold	03½
Pharmacist	02½
Portland	1.00
Prince A.	006
Vindicator	75
Work	15¾

Unlisted.

Stock.	Bid.
Golden Cycle	40
Jerry Johnson	05
U. G. M.	04½

Prospects.

Stock.	Bid.
Agnes	....
Amer. Con.	007
Banner	01
Blue B.	....
Bob Lee	007
Buckhorn	0075
C. C. & M.	....
Coriolanus	....
Creede	....
Des Moines	008
Gold Bond	....
Gould	01¼
Hart	....
Ida May	02
Jolly Jane	....
Keystone	01
Little Bessie	....
Little Nell	007
Little Puck	01
Mary Nevin	01⅞
Merrimac	....
Mt. Beauty	04¾
New Haven	01
Pilgrim	01
Princess	....
Republic	008
Requa S.	....
Robt. B.	....
Rose Maud	02
Rose Nicol	01
St. Thomas	01⅛
Teutonic	01

Miscellaneous.

Stock.	Bid.
Anchor	001
Aola	....
Black B.	001
Blanche	003
Cable	005
Colo. G. C.	003
Easter Bell	....
Fauntleroy	....
Favorite	....
Flower of West	007
Forepaugh	....
Golden Age	....
Goldfield	....
Gold Hill	002
Grace	....
Greater G. B.	....
Hummer	003
Key West	001
Kimberly	....
Kitty	002
Lucrative	0025
Marion	....
Matoa	005
Mariposa	....
Marquette	....
Missouri	006
Montreal	005
National	005
Nellie V.	003
O. K.	0045
Olive Branch	....
Palace	....
Pinnacle	....
Pointer	....
Pythias	....
Red Spruce	001
Tenderfoot	0035
Teas Girl	0045
Uncle Sam	003
Volcano	002
Wide Awake	001

New York

Oct. 17.—The attempt of F. Augustus Heinze, the Montana copper king, to corner the copper market has proved an utter failure, and may cause the financial ruin of Mr. Heinze. The stock of which a corner was attempted was United Copper, of which Mr. Heinze is president. On Monday Mr. Heinze and his friends bid up the price of United Copper from 35 to 60, and expected today to execute a brilliant coup on the stock. Twenty exchange houses were carrying the stock, and at 2 o'clock, they were all asked to deliver the stock, which the Heinze people thought it impossible to do, and they would in this way default to the Heinze's, but this was not the case, every one of the houses had the stock and produced it, and the Heinze people could not pay for it.

The firm of Otto Heinze & Company issued the following statement, stating that they would not, under the conditions pay for the default:

"Arthur P. Heinze is no longer a member of the firm of Otto Heinze & Company. The firm of Otto Heinze & Company feels itself perfectly solvent and will meet and pay all its just and legal obligations. It, however, refuses to pay obligations which it does not consider legal or just until a proper adjudication of the matter has been made.

"Rather than submit to such unjust demands it prefers to permit itself to temporarily be suspended from the privilege of the stock exchange."

F. Augustus Heinze said this morning: "I am considering resigning from the presidency of the Mercantile National bank, but whether my resignation will be tendered at the meeting of the board of directors today I cannot say. The troubles of the United Copper Company are internal and were brought about by differences between certain interests. I have much to do at this time in bringing about a settlement of affairs, and there is nothing more that I can say at this time."

Mr. Heinze arrived at his office at the Mercantile National bank early and held conferences with officials of the bank and several callers.

The resignation of Mr. Heinze from the presidency of the Mercantile National bank, of which he was president, was followed by the closing of the doors of the State Savings bank at Butte.

Almost all stocks took a downward turn, more so than last week, and the

week previous. Colorado Fuel and Iron declined a point and a half, but held its own fairly well, considering the onslaughts being made on the bear side. American Smelting is still on the decline, both in the common and preferred, having dropped half a dozen points from our quotations of last week. It is expected, though, that a reaction will set in, and the upward start of the market is said to be already in sight.

Following are the quotations:

Stock	Close.
Amalgamated Copper	49⅜
American Smelting	70⅝
American Smelting, pfd.	85
Colo. Fuel & Iron	15¾
Anaconda Copper	27¾
Republic Steel	17½
Republic Steel, pfd.	65
National Lead	40
National Lead, pfd.	87
U. S. Steel	22⅞
U. S. Steel, pfd.	83
Gen. Electric	111½
Utah Copper	15½

Curb Quotations.

*Stocks.	Bid.
Arizona Commercial	7½
Ahmeek	50
British Col. Copper	4½
Black Mountain	4⅞
Cumberland Ely	4⅜
Davis-Daly	4⅝
Ely Cons. Copper	½
Eagle	1⅛
East Butte	4¾
Furnace Creek	¼
Giroux	3¼
Greene Cananea Copper	6¾
Greene Gold-Silver	⅝
Globe Cons. Copper	3
King Edward	⅝
Mont. Sho.	4¾
Keweenaw	4
Mitchell	1
Nevada Utah	2⅛
Nevada Cons.	7
Nipissing	5¾
Tintic	3¾
Utah Apex	2⅝
B. & L.	....
Maj.	85
Newhouse	5¾
Empire	150
Ely Giroux	1
Dom. Copper	1⅝

*Otis & Hough.

Boston

Oct. 17.—A man who has an investment of many thousands of dollars in the shares of Copper Range Consolidated Company, and in fact is one of the largest stockholders, says:

"I note a general disposition to speak of Copper Range and North Butte as properties of equal merit. There are to be sure several points of similarity. They have practically the same share capital; pay the same dividend; produce about the same amount of copper, and at practically the same cost per pound. I have also heard some expressions of surprise that Copper Range should at this time command $10 or $12 per share above the quotation for North Butte. To me it is not strange.

"It cannot be denied that there is today a stronger degree of confidence with regard to the management of the Copper Range property than ever before. On Oct. 1st there were exactly 5,008 shareholders in the company, and new stockholders are being added every day.

There are points of difference which may be emphasized. For instance, North Butte is hoisting its rock from one shaft; Copper Range is hoisting from twelve shafts, equipped with steel rock houses at a total investment of well over $1,500,000.

"North Butte has no smelter; Copper Range has a very substantial interest in one of the best plants in the country. North Butte has no railroad; Copper Range has a railroad earning $1,000,000 per annum gross, and which next year should return Copper Range $1 per share, or $385,000.

"There is a non-fluctuating character to the Lake Superior ores, not found in Montana. North Butte must inevitably find lower grade ores with depth. This means a rising cost sheet per pound of copper."

The Amalgamated mines have so far shut down in Butte that only 1,000 tons of ore a day are going to the Washoe smelter, whereas formerly 10,000 tons were shipped there daily.

Fifteen hundred tons are being shipped daily to the Great Falls smelter, a reduction from 4,000 tons.

The Amalgamated is refusing to treat custom ores and is endeavoring to get all the producers in Butte to cooperate in the shut down movement.

The only mine of the Butte Coalition Company which is working in the Rarus, containing the richest ore. The North Butte has curtailed to about 40 per cent. of its normal output.

The Davis-Daly people are still driving the development work except in the original cross-cut.

The Butte Miners, who have left camp by the thousands, have gone south to prospect this winter, and it is expected that the mineral area of the west will be very greatly enlarged by the thousands of prospectors who are going into the southwestern hills.

A single train from Butte to Salt Lake recently carried 1,500 miners, and the train had to be run in three sections.

The miners had withdrawn heavily from the savings banks before departing.

Following are the quotations:

Boston.

*Stocks.	Bid.
Adventure	1
Arcadian	3
Allouez	23
Atlantic	7⅜
Bingham	4½
Boston Con.	11¼
Balaklala	3¾
Butte Coalition	10¼
Calumet & Hecla	605
Calumet & Arizona	92
Centennial	17
Copper Range	46½
Daly-West	9½
Franklin	6½
Granby	75
Isle Royale	13⅛
La Salle	9
Mass	3
Michigan	6½
Mohawk	41
North Butte	35½
Old Dominion	19¾
Osceola	80½
Parrot	9
Quincy	72
Shannon	7¼
Tamarack	....
Trinity	11¾
United Copper	11
U. S. Smelting	34½
U. S. Smelting, pfd.	34¾
Utah Cons.	28½
Victoria	3¾
Winona	2¾
Wyandot	75
Wolverine	93

*Otis & Hough.

Nevada

San Francisco, Cal., Oct. 15.—Following were the closing quotations on mining stocks today:

Comstock.

Stock.	Bid.
Ophir	1.40
Mexican	65
Gould & Curry	23
Cons. Virgina	72
Savage	67
Hale & Norcross	75
Belcher	41
Confidence	....
Sierra Nevada	64
Exchequer	27
Union	40

Tonopah

Tonopah of Nevada	8.50
Montana Tonopah	1.75
Tonopah Extension	1.45
MacNamara	23
Midway	70

Tonopah Belmont	1.45
Tonopah North Star	10
Ohio Tonopah	02
West End Cons.	45
Rescue	06
Tonopah & California	06
Golden Anchor	07
Jim Butler	54
Cash Boy	03
Home	03
Monarch Pittsburg Ext.	....
Montana Midway Ext.	....
Golden Crown	....

Goldfield.

Sandstorm	20
Columbia Mountain	21
Jumbo Extension	97
Vernal	....
Booth	20
Blue Bull	20
Adams	08
Silver Pick	27
Nevada Boy	04
Black Butte Extension	04
Blue Bell	09
Dixie	03
Goldfield Columbia	....
Hibernia	04
St. Ives	43
Conqueror	07
Black Rock	02
Lone Star	13
Potlatch	....
Oro	12
Kendall Extension	....
Sandstorm Extension	....
Mayne	03
Atlanta	25
Great Bend	28
Simmerone	08
Empire	....
Red Top Extension	16
Florence	2.72½
Diamondfield B. B. Cons.	16
Goldfield Daisy	'55
Combination Fraction	1.00
Great Bend Extension	....
Milltown	....
Black Butte Bonanza	03
Kewanos	25
Esmeralda	....
Portland	07
Crackerjack	10
Red Hills	23
Mohawk Extension	06
Lou Dillon	07
Yellow Tiger	....
Grandma	07
Silver Pick Extension	....
Yellow Rose	04
Columbia Mountain Ext.	....
Goldfield Cons.	5.00
Diamondfield Triangle	08
Coming Nation	04

Bullfrog.

Original	03
Bullfrog Mining	04
Montana Bullfrog	02
National Bank	01
Amethyst	03
Gold Bar	39
Steinway	....
Denver Bullfrog Annex	03
Bonnie Clare	....
Mayflower Cons.	21
Montgom'y-Shoshone Ext.	03
Golden Sceptre	04
Montgomery Mountain	05
Bullfrog Diamondfield	....
Homestake Cons.	71
Yankee Girl	....
Nugget	03
Tramp Cons.	17
Victor	02
North Star	....
Sunset	....

Manhattan.

Manhattan Cons.	30
Manhattan M. Co.	....
Gold Wedge	04
Seyler-Humphrey	02
Dexter	05
Little Joe	01
Crescent	02
Combination	02
Granny	20
Mustang	17
Little Grey	....
Cowboy	03
Original Manhattan	....
Broncho	03
Pinenut	05
Buffalo	02
Stray Dog	09
Yellow Horse	02
Indian Camp	05
Standard	....

Other Districts.

Fairview Silver King	....
Fairview Eagle	75
Pittsburg Silver Peak	1.17½
North Star Wonder	....
Eagle's Nest	30
Ruby Wonder	....
Alice of Wonder	....

Metals

St. Louis, Oct. 17.—Lead—Dull; $4.50.

Spelter—Dull; $4.50.

New York, Oct. 17.—Lead—Easy; $4.60@4.75.

Lake Copper—Weak; $12.75@13.00.

Silver—60⅛c.

WASHOE SMELTER DECISION.

Butte—The findings of Oliver T. Crane, master in chancery in the famous smelter smoke case against the Amalgamated Company on account of the Washoe smelter, were very favorable to the company and are against the granting of an injunction. The master finds that the farmers have been damaged some by the arsenic but not by sulphur He says that an injunction and the closing of he smelter would damage the farmers and community more that a continuance of the nuisance complained of and that the company has been doing everything possible to avoid damage and that the smelter is built in a location where it will do less damage than at any other available place.

As the company has always been willing to pay some damage, the findings are considered a victory for the company.

Farmer Bliss, the plaintiff, in the suit in which the findings are made, is allowed $350 damages.

Judge Hunt of the United States Court, has yet to pass on the findings, and wil finally say whether or not the injunction shall issue.

UNITED STATES TREASURY.

Fiscal year 1907-8:

	Oct. 8.	This Month.	Fiscal Year.
Receipts	$1,811,868	$15,044,017	$180,615,247
Expenditures	2,100,000	14,400,000	184,390,493
Deficit	$ 288,132	*$ 644,017	$ 3,775,246

*Surplus.

Fiscal year 1906-7:

Receipts	$2,994,454	$14,354,162	$174,157,802
Expenditures	2,460,000	15,460,000	169,392,326
Surplus	$ 534,454	*$1,105,838	$ 4,765,476
*Deficit.	Oct. 8, '07	Sept. 8, '07	Oct. 8, '06
Available cash balance	$240,772,695	$236,867,818	$222,369,813
Of which in banks	172,381,218	158,107,285	150,654,710

National bank notes received for current redemption: This day, $939,875; this month, $4,694,137; fiscal year. $72,282,555; national bank notes awaiting redemption, $18,571,186; 5 per cent. redemption fund, $21,845,746.

BANK CLEARINGS.

	1907.	1906.		Changes.
New York	$296,845,167	$408,312,494	Dec.	$111,467,327
Chicago	39,913,507	38,765,406	Inc.	1,148,101
Boston	26,434,794	33,191,266	Dec.	6,756,472
Philadelphia	23,334,359	24,226,635	Dec.	892,276
		10,312,787	Inc.	1,717,184

MACHINERY AND EQUIPMENT

Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.

HAMPSON & FIELDING.

The mining machinery firm of Cary & Fielding, 1711 Tremont street, has been dissolved, Mr. Cary retiring.

The firm is now Hampson & Fielding, Charles M. Hampson and Thomas Fielding. Mr. Hampson was for twelve years with the Colorado Iron Works Company, and for six years with the George J. Leyner Drill Company. He is an expert machinery man and is acquainted in about every mining camp in the Rocky mountains. Thomas Fielding has been connected with the Rand Compressor Company's office in Denver for twenty-five years, and the office has placed during the time 270 of the Rand plants with their complement of drills in this state alone, ranging all the way from one to fifteen drills each. About all the large mines of the state have been equipped at some time during their development with these popular machines. The Rand compressors and drills are in use wherever mining is done in all parts of the world. The Denver house has installed thirty-two of these plants in the San Juan alone.

A. E. Reynolds, the most extensive mining operator in the state, has purchased and installed twenty-four on his various properties in all parts of the state. The great Bassick, near Silver Cliff, Custer county, was opened with the Rand compressor and drills; the Virginius, near Ouray; the Tomboy, San Miguel county; Smuggler-Union, and dozens of others on the San Miguel, Ouray and San Juan slopes of the mountains. The Gold King and Grand Mogul, Old Hundred, Hercules, Sunnyside, and a score of others are equipped with the Rand plants in San Juan county.

Cameron Pump, Handled by Hampson & Fielding.

The great mines around Aspen owe their development largely to the Rand compressors and drills. The plants are popular in every mining camp of the state, and Messrs. Hampson & Fielding are prepared to fill orders in the shortest possible time. They are well known machinery men, highly competent and strictly reliable. In addition to the Rand compressor and drills they carry the Atlas boilers and engines, Janesville and Cameron pumps, Whiting cranes and a large amount of other machinery.

Hampson & Fielding are at the old stand, 1711 Tremont street, Denver, and, as in the past, will give their patrons the best in their line. It will pay mining men to communicate with the firm.

Kelly's Powder Heater.

THE KELLY POWDER HEATER.

B. F. Kelly, an old time Colorado tunnel driver, has invented and is putting on the market a powder heating machine that is very highly spoken of by practical miners. It is to be manufactured and introduced in the mining camps of Colorado by the Hendrie & Bolthoff Manufacturing and Supply Company, of this city.

This powder heater consists of a box made of heavy galvanized iron, lined with asbestos and painted. A pan made of heavy galvanized iron with a screw cap is placed in the bottom of the box, and over that a rack made of wires with meshes for holding the sticks of powder, no two sticks being in contact with each other.

The can is filled with water and placed on the forge. After the water has reached the boiling point the cap is screwed on tight and the can placed in the bottom of the box, with the wire frame containing the powder over it. Within two hours the powder is evenly heated, without drawing the glycerine to the wrappers, as is done by other methods. This purpose is accomplished by the even heat given to the powder with a constantly decreasing temperature. The danger point cannot possibly be attained.

The box is so carefully insulated that the heat is retained for from twenty-four to forty-eight hours.

The low regular temperature keeps the powder in its original state until it is shot, thereby saving from twenty to fifty per cent. over powder heated in any other way. For further particulars send to Hendrie & Bolthoff for catalogue.

THE KARNS DRILLER.

J. C. Karns, the inventor of the Karns drilling machine, has just returned from Cleveland, where the machines are being manufactured. The company has two of these great tunnel borers already on the way to the Rocky mountains. One is to be installed in Utah and the other in Colorado. Recent improvements have been made in the great machine, so that now it is pronounced a practical success. Orders are far ahead of the company's ability to fill, but capacity of the manufactory is being increased to enable them to meet the demand. The air drill weighs 5,000 pounds, the largest ever made.

The company expects to sell two or three of the machines to the Continental Tunnel Company, that has been organized to drive a great bore six or seven miles through James' Peak for the Moffat road.

Mr. Karns says there will be a demand for them in every mountainous country in the world where mining is

"Imperial" Ingersoll-Rand Compressor, Handled by Hampson & Fielding.

done and railroad building carried on. He says the machine is beyond the experimental stage, and is now ready to do its work as represented.

A NEW PLACER MACHINE.

G. W. Linn of Omaha, Nebraska, is exhibiting a rotary placer amalgamator, with three cylinders, at the Flint & Lomax machine shops on Delganey street, between Fourteenth and Fifteenth streets.

He claims that very little water is required with which to operate it in gravel or sand washing, and it can be operated by hand, water, gasoline engine, electric motor or steam power, as conditions will warrant.

In the model shown there is abundant amalgamating surface to catch and retain all particles of gold however fine that the material may contain. When water is scarce the flow may be used over and over again. The machine is light and may easily be transferred from one point to another. The one under consideration is two feet wide by eight feet in length and will handle about forty tons per day. Mr. Linn will spend the winter here in exhibiting his invenention, and all subsequent ones will be manufactured in Denver. He has orders from Nevada and California, but as the machine is only just completed none have been filled. He slaims that it will recover any values that can be saved by amalgamation at less expense and with less water than is possible by any other method.

With it in practical operation we may be better prepared to pass upon its merits. Mining men all over the world are watching for improvements in mining machinery, and there is nothing more facinating to a genuine mining man than improved machinery —except a rich strike. They stand ready to give it a fair and impartial trial.

THE KELLY CANDLE STICK.

B. F. Kelly, a well known mining man of Colorado, has become an inventor. He has invented and is putting on the market a miner's candle stick that for simplicity, durability, convenience and cheapness surpasses any miner's hand-lighting machine ever made. It is made from the best tool steel, polished and is eleven and a half inches in length.

The candle socket is made of the best spring steel and is interchangeable. The reflector, or shield, is of brass, nickle plated, thus protecting the candle against strong draught and gives several candle power light. It is adjustable and interchangeable. The crab is of tool steel and holds the candle straight on the wall or face. It will set level on the bottom of drift or table,and is adjustable and interchangeable. Practical miners say it works like a charm and thousands of them are being ordered.

For full particulars address B. F. Kelly, inventor and manufacturer, 326 Atlas block, Salt Lake City, Utah.

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OBITUARY

Barry Sullivan, son of Dennis Sullivan, a prominent mining and business man of this city, died at Mercy hospital Thursday, October 10th, of appendicitis. He was born in Central City, this state, in 1878 and was married in Denver to Miss Mary Morey in 1903. The father and mother, wife and three children survive him. Barry Sullivan was one of the brightest and most popular young men in Denver. He was Dennis Sullivan's only son and a graduate of Yale. A brother, Thomas, also a Yale graduate, died in New York City in 1899 on his return from the Spanish-American war. Barry Sullivan was highly competent to carry forward his father's extensive mining and other valuable holdings and had he lived these great property interests would have fallen into his management. In the pride of his strength, in the vigor of his intellect, he has gone from us, leaving a wide circle of friends and relatives to mourn the going out of his bright young life.

Dr. M. Beshoar, one of the early settlers of Trinidad, who died at his home in that town last month at the age of seventy-four years, was the founder and owner of the Pueblo Chieftain as far back as the 60s, and subsequently settled in Trinidad, where he started and published the Trinidad Advertiser. He was a thoroughbred Southerner, and in the war of the rebellion, served as regimental surgeon in the Confederate army. Dr. Beshoar, however, accepted the inevitable, and became a valuable and popular citizen of Colorado.

According to statements made in Wall street, plans have been completed for the formation of a $50,000,000 holding company of the copper properties in the Ely, Nevada, mining camp. The principal copper concerns which are to be included are the Nevada Consolidated Copper Company, the Cumberland Ely, the Giroux and the Ely Mines Company. The Guggenheim interests, on behalf of the Guggenheim Exploration and the American Smelting & Refining Company, are now important stockholders in the Cumberland Ely and the Nevada Consolidated. In fact, it is popularly believed that the Guggenheim interests control these two properties. Each has $5,000,000 capital.

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(Continued from Page 29.)

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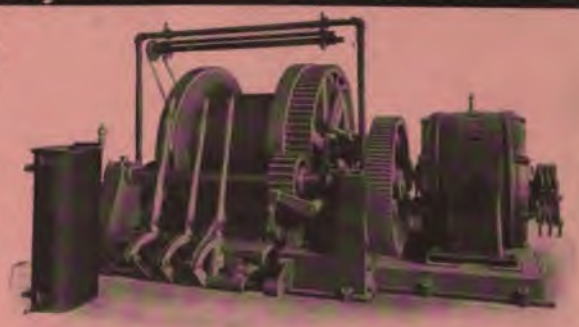

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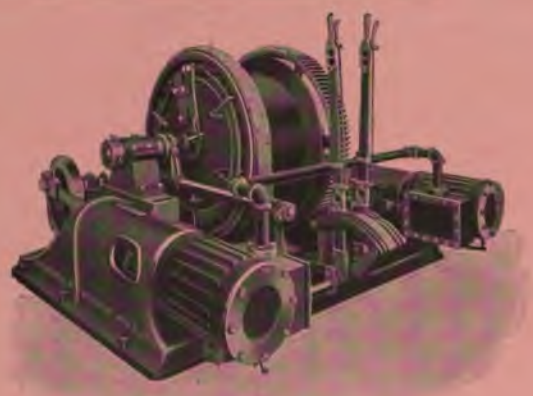

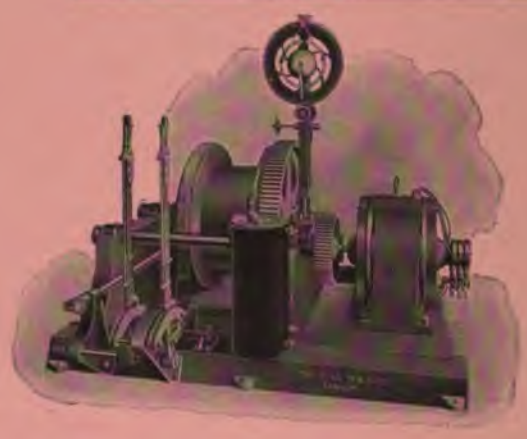

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MINES AND MINING

WEEKLY

Vol. XV | Denver, Colorado, October 25, 1907 | No. 4

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*Illustrated.

Another Railroad for Denver

H. Larson, a well known contractor and builder of Rawlins, Wyoming, was in the city a few days ago and stated that the building of the Moffat road had started a boom at his town and Lander for a line from the latter point via Rawlins to connect with the Moffat road at Steamboat Springs. He says the people up there are in earnest about it, as such a line will afford them better facilities for shipping their products to the Denver market. Mr. Larson says Rawlins and Steamboat Springs people are interested in the project and subscriptions are already being taken to raise money for the preliminary survey. "We will first," says Mr. Larson, "secure money enough for a survey, so that we can make a close estimate of the probable cost of the road. After this is made money will be subscribed for the building of the line. Rawlins is determined to be on a line of railroad which will give it close connections with Denver, and once the Rawlins people make up their minds to do a thing nothing can stop them."

The proposed line from the Moffat road at Steamboat Springs to Rawlins and Lander, Wyoming, if built, will be a direct competitor of the proposed Denver, Laramie & Northwestern railway, which is projected from Denver to Laramie, to Lander and finally to the Pacific Northwest.

Mr. Larson says that the railroad proposed by the Rawlins residents will cause a large part of the annual shipments of 1,000,000 sheep made from Sweetwater and Carbon counties to come to the stock yards at Denver. Cattle are also raised in sections to be traversed by the new line, and virgin mining districts will be opened.

The line will tap the Watertown mining district, which is really a part of the Ferris-Haggerty district, where a new smelter is being erected. From the description of the country given by Mr. Larson, it is evident that such a line as the Rawlins people propose will be a paying proposition.

The construction of the proposed road will not be very expensive, as there is no mountain work of any moment, and the grade will be made down valleys and over level places. An estimate of the probable cost cannot be made until a survey is completed and the distance figured out. From Steamboat Springs to Rawlins is about 100 miles.

By building northwest from Rawlins to Lander, a connection would be made at the latter point with the Chicago & Northwestern, thus making an almost due southeast and northwest line from the heart of Wyoming to Denver, the business center of this trans-Missouri country.

From Lander the line could be taken up and pushed on into Montana, British Columbia, Washington, to Puget Sound or other points in the great Northwest. This is an era of railway building and it will not stop until they bisect the North American continent like a checkerboard.

Denver Machinery Going to New Zealand

John Strathern, a prominent mining man of Auckland, New Zealand, has been in Denver several days, where he had made an extensive hot blast pyritic smelter plant for his company. The work was done at the Colorado Iron works. Mr. Strathern is a well-informed Scotchman, and represents the Ferguson Mining & Smelting Company of Auckland. He says Denver-made mining machinery has a high reputation all over the mining world. The pyritic plant he had made here cost from $30,000 to $40,000, not including transportation to Auckland. This machinery amounts to sixteen carloads and has already been shipped to San Francisco where it is to be transferred to steamer and forwarded to Auckland.

Mr. Strathern says the Ferguson company is a heavy operator of copper mines in New Zealand, and is determined to have the latest and most improved machinery made. The American made machinery was recommended to him by Charles E. Storie, an able mining engineer who has had much practical experience in the mining fields of Colorado and other western states.

Mr. Strathern says the mine operators over there have been milling their ores and gathering what they could by amalgamation and concentration, shipping the pulp to Australia, Swansea, and to some of the American ports, a very extravagant method of operating. These concentrates were quite rich, carrying as high as $165 per ton. Mr. Storie having set forth the greater advantage of matte smelting

for copper ores, his views were adopted and an order placed with the Colorado Iron Works of Denver for a complete equipment, and he was at once appointed consulting engineer of the company.

Mr. Strathern stated to Mines and Mining before leaving for California that his company had selected especially for this pyritic plant 565 acres of mineral land on the Thames, Coromandel peninsula, a range similar to the Rocky mountains. This range is long and narrow, extending clear across the peninsula. The Thames is the oldest gold field in New Zealand, having been mined for forty-five years. The camp where this plant is to be installed is eight miles north of the Thames, along the peninsula, with an all-sea frontage, the ores containing a naverage of about four per cent. copper and $30 in gold and silver. Some of the lodes contain galena. The company is entirely satisfied with the quality of the ores and will smelt on a copper basis, sorting out the lead, of which there are large quantities in the combination, for subsequent attention. The veins or lodes vary from two to eight feet in width. All mining is done by cross-cut tunnels, drifts and saope. The company has over twenty mining tunnels and has intersected nearly 100 lodes of various sizes. As a matter of fact, the entire peninsula is one great mass of lodes.

The Thames peninsula is sixty miles in length and, as already stated, is one mass of lodes. The Ferguson company has also the ownership of over 2,000 acres of what is called "native land," situated at Whangaroa, about 125 miles north of Auckland, containing large deposits of copper pyrites, to which it intends to devote some attention in the near future. This is one of the oldest and most beautiful harbors in New Zealand. Speaking of the Waihi, the second largest producer of gold in the world, Mr. Strathern said: 'They have always a five years' supply of ore in sight. The lodes are from thirty to sixty feet wide, the material averaging $12 to $14 per ton, treated altogether by cyanidation. The monthly values return is from $215,000 to $220,000. The values improve as the lodes are penetrated by the shaft system, for no tunneling is done at the Waihi. The mill has 500 stamps. They have reached depths of 1,500 to 1,600 feet and are still sinking. The entire underground workings are lighted by electricity and the mining is done with compressed air drills. The ore bodies are very extensive.

The Waihi company has been in active operation ever since the cyanide process came into use. This mine is at the other end of the peninsula, about thirty miles from the mines of Ferguson company.

When Mr. Strathern was asked when he expected to reach Auckland he smiled and replied, "Well, it is a long voyage, but I hope to arrive there before the Christmas holidays." In concluding the interview he informed us that Mr. Nesmith and his aids had assembled all parts of the smelter plant he has purchased and taught him how to put them together with the knowledge possessed by Mr. Storie, the American engineer, will enable them to put the plant on an operating basis right speedily. "Then," said he, "after we have demonstrated the method to our company and to other big operators you may be sure that Denver will receive orders for a very large amount of smelting, milling and mining machinery, for I have learned much of your better ways of doing things since I came to Denver."

The Red Canon Swindle

It was announced a few days ago in Cheyenne that the Red Canon bubble had exploded with startling effect, creating a sensation over a wide extent of that usually well regulated state. Reports from Cheyenne state that the Lander people deny the story about the placer ground being worthless and that the placers sold to the Washington-Montana-New York syndicate, headed by the Greenough brothers, were "salted," but the fact remains that the Greenoughs have ceased all work, paid off and discharged the men and orders for material and supplies have been cancelled. Some of the business men of Lander are loth to believe that a swindle has been carried to a successful conclusion right under their very eyes but the actions of those who were caught tell the story.

Business men, liverymen, stage lines and all classes of business received an impetus through the operations of the Greenoughs, and ranch property along every stream in the vicinity of Red Canon jumped in value from a few dollars per acre to as high as $200 and $300 an acre. Some ranchmen, believing that their ranch lands were fabulously rich in placer gold, would not sell at any price.

It is estimated that the capitalists taken in by the smooth swindle have expended over $500,000, and this loss, with the redemption of outstanding stock, will probably run their losses up to $1,000,000. They are said to be very wealthy, however, and will not be seriously crippled by their investments in the Red Canon placers and surrounding ranch property, timber lands, water rights, material and supplies, etc.

Detectives are now in the field gathering evidence and arrests will probably be made shortly. It is alleged that two or three mining experts who have heretofore been regarded highly, will find it difficult to explain their glittering reports on the properties.

Mining men say that the salting of the Red Canon placers was the smoothest job ever handled in the West, but they are unable to even venture a guess as to how it was done to so effectually fool the mining experts.

As long as the sharks are permitted to run at large they will find suckers to fatten on. They are coevil, coexistant and co-operative. The shark could not flourish without the sucker, and the sucker would not be in his element were it not for the shark. The shark lifts the sucker up to the seventh heaven and then lets him down with a dull thud. It takes all kinds of fish and all kinds of people to make up the grand catalogue.

Coal Enough to Last Two Thousand Years

The Germans have recently been giving some statistics of the coal resources of the world. They estimate Germany's supply at 280,000,000,000 tons, which they claim will last at the present rate of consumption about two thousand years. The total deposits of Great Britian and Ireland are placed at 193,000,000,000 tons, with an annual consumption twice that of Germany. The estimated resources of coal fields of Belgium is 23,000,000,000 tons; of France, 19,000,000,000 tons; Austria has 17,000,000,000 tons of coal deposits, and Russia 40,000,000,000 tons unmined. The unmined deposits of coal in North America are estimated to be 680,000,000,000 tons, or a figure greater than the aggregate deposits of the countries above named. Asia is conceded to have vast deposits of coal, but even an approximate estimate of their extent cannot well be given.

Of course, the foregoing figures are merely guess work, but when Mother Earth runs out of coal she will probably have something better to take its place. The genius of man cannot measure the length, breadth and depth of the coal measures of the earth.

In France the depth of drill holes for blasting is restricted to one and one-half meters or about five feet. The miner is forbidden to touch a hole after it has once been fired and when a shot is missed, the hole must be drilled over.

The Sinaloa District of Mexico

By E. A. HAYES
Staff Correspondent Mines and Mining

At a point in Mexico sufficiently indicated, perhaps, on the following diagram for identification, are located several fabulously rich mines.

The El Tesoro mine noted in the center of the diagram produces gold and silver that runs all the way from $20 to many thousand dollars per ton. One of its ledges (more than fifty feet wide) produces average gold values of over $50 a ton. There are many rich veins on the property and two wide mother lodes. On one of the veins in a stringer, more than $1,400 a ton in gold was taken out. On another vein the average values in gold exceeded $180 per ton. In cutting away the dense growth of brush on a hill side, Mr. Ivy, one of the owners, discovered an old antique working. No one could tell its age or its history, but it had the earmarks of the Aztecs. It has proved to be as rich as the rest. In every place on the El Tesoro property where work has been done high grade values have been found. The property belongs to Harlan Brothers of St. Louis, and Mr. T. E. Ivy, under the name of the El Tesoro Mining Company. New machinery, including stamps, concentrator, cyanide outfit, etc., will soon be on the ground ready to set up.

The San Antonio mine is located about twelve miles southwest of Eltesoro and the story of it reads like a tale from Arabian legends. It produces mostly gold. The main vein here is from three to eight feet wide running in high values of sulphide ores. A pay streak thread runs through it from two to ten inches wide that runs from $1,442 to $219,000 per ton—the lowest value found being $1.442. The rest of the ledge runs about $50 per ton.

This property is owned by the Sierra Madre Development Company of St. Louis, Missouri. A. W. Warwick a prominent mining engineer of Denver, Harlan brothers of St. Louis, and Mr. T. E. Ivy of Los Angeles. The property was sold by Mr. Ivy to Mr. Warwick and by Mr. Warwick to the St. Louis company. All parties retain some interest. The consideration was very large. The pay streak mentioned has been followed on the surface for over 1,200 feet.

The fabulous assay mentioned came from the greatest depth attained, viz.: fifty feet. The mine was discovered by peons and worked by them in a crude way till Mr. Warwick purchased it. It is a mighty rich proposition. Wood, water, and good climate prevail abundantly.

The Yedras mine, just south from the one described, is known far and wide; and for many years bore the distinction of being the largest plant in Mexico off the railroad. This mine has produced more than $7,000,000 and when in commission worked forty-five stamps. The product was mainly silver, but when the white metal was demonetized, the mine for that and other causes, shut down.

This property is owned and controlled by Senator John P. Jones and his brother Sam, H. M. Gorham and T. E. Ivy of Los Angeles, California. Arrangements are being made to start work again, and ere long the stamps of the Yedras will be pounding.

The Guadalupe, in the La Cumbra district, in another rich gold proposition. It is owned by New York City people. Over 2,300 feet of work has been done. Great values have been taken out and millions are in sight. This mine is over seventy-five years old.

The Clemencia, in the same district as the Guadalupe and in close proximity to it, is owned by Mr. Ivy, John and James Crera of Chicago, and Denison, Texas, capitalists. Its ledges are wide and well defined and rich in the yellow metal. Several thousand feet of work has been done. This mine was worked years ago by the Aztecs, but the bubonic plague drove them out of commission and for many years it lay as hundreds of other mines do in Mexico, idle and desolate. This property is very valuable.

The Es Miralda mine, not far south from the center of the diagram is fitted out with a ten stamp mill, cyanide and electric plant and wireless telegraphy. It is fabulously rich in gold and millions of dollars have been taken out and millions remain to be extracted. It is owned by Mr. George M. Holmes and Mr. Abraham White of New York.

The Sierra Coloral, located a few miles northeasterly from the Eltesoro in Chihuahua has a history that reads like a romance. Many years ago an Indian living in a Mexican village about three or four miles away from the property was often seen about the village with large amounts of gold. He was frequently urged to tell where he got it; but like "Scotty" of modern times, he refused to tell. He drank himself to death with mescal and be-

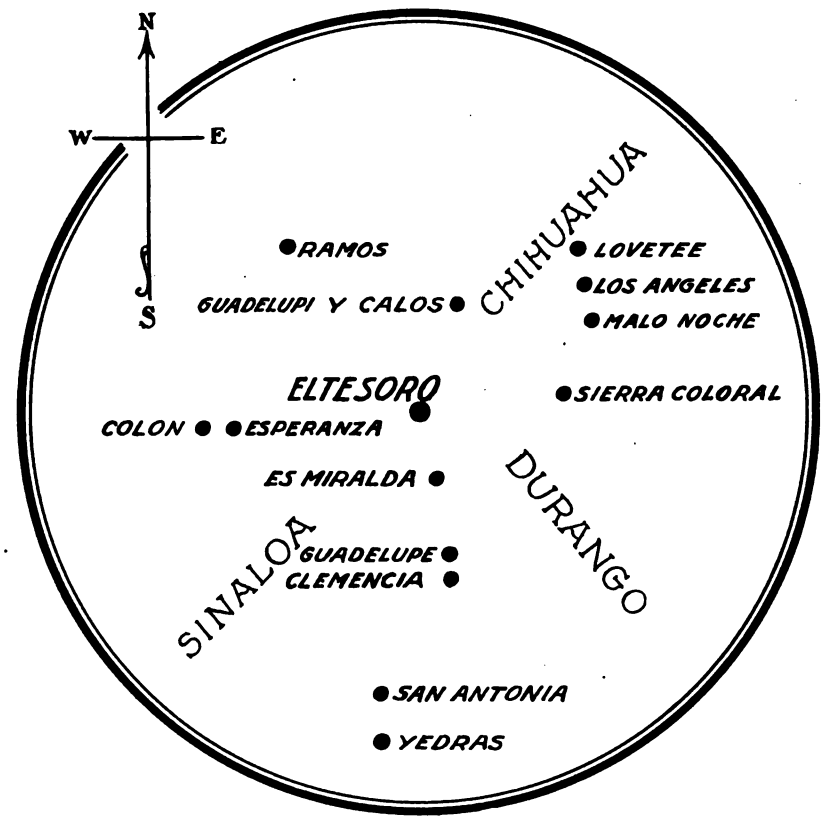

Diagram of Sinaloa District.

queathed his secret just before he died to his wife. She, like her husband, refused to tell from whence came the gold. One night a band of ruffians came to her hut, bound and threatened to kill her unless she disclosed the secret place of the gold. They cruelly tortured her till she promised to lead them to the place. One moon-light night they started out and reached the spot; but the old Indian woman pretended that she could not find it. The Mexicans took her to the top of a high cliff and told her that they would throw her over the precipice unless she told. She refused and the villains did throw her over it, and she was instantly killed. The place where she struck the ground is to this day marked with a cross and nearly every month in the year the cross is decorated with bright flowers. The spot is only a few feet away from the main trail to the mine. Fifty years later a Mexican named Simon Carriella denounced six pertenencias of land which included the old workings. Later on Mr. T. E. Ivy of Los Angeles, purchased the property from the Mexican and also denounced 114 more pertenencias adjoining it. In turn he sold a part interest in it to Mr. George D. Moulton, of Dennison, Texas.

One ore vein on this property is fifty-eight feet wide and carries high concentration values. Another vein eight feet wide of solid ore runs $9 in gold and twenty-eight ounces of silver on an average. A "pay" streak several inches wide in this ledge or vein, runs all the way from $150 to $1,800 in gold. Just a few weeks ago at a depth of fifty feet ore was struck that assayed 452 ounces silver, forty-eight per cent. Bornite, copper, and $6 in gold. Fifteen veins have been opened on the Sierra Coloral and in each instance high grade ore has been found.

Soon after Mr. Ivy bought the property, in exploring he found an old covered tunnel in the eight foot quartz vein. At one side of it was a hole about large enough for one man to work. At the breast of this narrow hole of tunnel were found the crude little tools the old Indian used in extracting the metal that cost his widow her life. Mr. Ivy took out ore from this spot that assayed $1,800 per ton; he also has the old Indian's mining tools as relics.

The Sierra Coloral seems to be on the mother lode of the country and while yet a prospect, it is destined to become a huge bonanza.

The Malo Noche mine, not far from the Sierra Coloral, is owned by M. W. Lafayette of Checotah, Indian Territory. A mill is going up and several hundred feet of work has been done. The ore is of high grade and the ledges wide. The product is gold and copper and high hopes animate those in control.

The Los Angeles mine is one of the biggest and best properties in this bunch of bonanzas. About 1,000 feet of work. has been done. A stamp mill cyanide plant and other machinery mark the site. Seven hundred and fifty-six thousand dollars worth of ore is blocked out and in sight on four sides that will average $11 a ton in gold; fifty-three per cent of this is saved by plate amalgamation, and cyanide saves the rest, so closely that only about 50 cents per ton in values are left in the tailings. There are over twenty mines in the Los Angeles group. The House of Stalforth of Parral, Mexico, own this property.

The Loretta. This mine is an old one, formerly worked by Mexicans. The property is located about three miles north of the Los Angeles and its veins and ores are identical with that mine. The vein is very wide. The pay streak is about ten feet wide and carries gold values averaging more than $20 per ton. The ore is free milling. Heavy pine timber surrounds the mine and water is abundant for power the year round, and it is not to exceed 1,200 ft. from the mouth of the tunnel. Considerable work has been done here in days gone by. A reduction plant will soon be up and the mine running again. It is a mighty good high-grade proposition.

The Ramos mine is being worked by a London, England, syndicate under a bond and lease. They are taking out a big bunch of gold. The work is being systematically done and the mine pays.

There are several other mines in this district (the San Juan) as well as many fine looking prospects.

The Colon and Esperanza mines are nestled down together like a pair of twins in a crib, northwest about eight miles from the Eltesoro. Both properties are yellow metal producers. Some of the assays show averages that are simply astonishing. This property is owned by a soldierly crowd, viz.: Colonel Schonefieldt of Muskogee, Indian Territory; Colonel Churchill, of Indianapolis; Colonel Givens of Muskogee; Mr. G. P. Cobb of Muskogee, and Mr. T. E. Ivy of Los Angeles.

Hundreds of other mines and prospects not mentioned in this article, are located within the magic circle and mineral wealth abounds in greater abundance than ever existed in "King Solomon's mines."

This country, now nearly 100 miles from a railroad, is reached by mule-teams over a fairly good trail. The men who have penetrated this country are a sturdy lot and fortune is coming their way mighty swift. When the new railroad is completed the mules loaded with gold ingots will not have to travel so far to reach it. If it keeps on showing up "colors" by the pan full it will not be long before the Southern Pacific will run a branch up the Sinaloa river to the center of this wonderful land of gold.

The mines mentioned are in the Sierra Madre mountains in the Mine district of the state of Chihuahua. The capital of this district is Guadalupe y Colos. Here the Mexican government erected a mint in 1837, and it stil stands, though not doing business. Over $100,000,000 have been minted in the mint at this place and $40,000,000 of it came out of the Rosario mines in Guadalupe y Calvo.

GRINDING QUARTZ.

In the grinding of the massive forms of quartz two general processes are used, which may be called the "wet process" and the "dry process."

In the wet process, says Edson S. Bastin of the Unitd States Geological Survey, the quartz is usually first crushed in a jaw crusher and then still further reduced in size in chaser mills. After this it is ground in "wet pans" provided with a pavement of flat-faced quartz blocks over which move several large quartz blocks, the crushed quartz being pulverized between these blocks and the pavement.

The grinding in the wet pans usually occupies about twenty-four hours, the load ground in a single pan varying from 1,200 to 1,800 pounds. From the wet pans the paste-like mass of quartz and water is drawn into settling troughs, the first settlings being in some cases returned to the pans for further grinding.

In the dry method of treatment the quartz is usually crushed first in a jaw crusher and then between steel rollers, though in some cases it goes from the jaw crushers to a gyrating crusher before passing the rolls. Quartz to be used for fillers and for abrasive purposes is then screened to various degrees of fineness, usually on revolving screens, and is packed in bags for shipment. In the manufacture of the finer grades for use in pottery, wood fillers, scouring soaps, etc., the material after leaving the roll crushers is ground in ball mills, either of the continuous or of the intermittent type. It is graded to various sizes either by bolting or by a pneumatic process whereby the quartz powder is carried by a strong air current through a series of tubes and receptacles, the distance to which the material is carried being dependent on its fineness.

Geology of Diamonds: A Scientific Controversy*

A Scientific Controversy.

Dr. Voit's very able paper on the above subject have brought us a good step further towards the solution of the geological questions connected with the interesting occurrence of the diamond-bearing rock. His patient and laborious accumulation of data and the clear exposure thereof deserve all credit and appreciation. I only wish to touch upon a few points in his paper which seem open for controversy still, leaving the full treatment of the questions involved to some later date. According to Dr. Voit, the occurrences of kimberlite in pipes and in dykes (or fissures) are not contemporaneous, pipes being younger than dykes. This view is shared, I believe, by a great number of our local colleagues, and was originally based upon the fact that fissure rock has occasionally been found in pipes, whilst pipe-rock is supposed to be totally absent in the fissures.. The fact mentioned by Dr. Voit of the abrupt ending of fissures when coming into a pipe is brought forward by him as additional proof in support of this contention. When basing our ideas on the generally accepted theory of Daubree's, according to which diamond pipes were originated by a violent explosion of gases accumulated under high pressure, bursting through the over-lying strata, we must bear in mind that our French master founded his theory on the assumption that these strata were still unbroken. His now classical experiments clearly showed this, for to demonstrate the probable correctness of his theory he took a plate of glass which was sound and showed no cracks or fissures. A violent explosion on such a piece of glass produced a round hole "diatreme" the rim of which was not bended or contorted, no more than are the sedimentary strata round those curious necks in Fifeshire, round the "Maaren" in Swaben, and round the kimberlite pipes here. Daubree's theory was the more readily accepted, as it soon became evident that these necks and Maaren were not situated on the lines of pre-existing fissures or faults, so that his experiment could justly claim to have been executed under conditions similar to those existent in nature prior to the formation of those necks and "Maaren."

On the other hand, it is daily proved in mining that a violent explosion in fissured rock never produces a round hole, the gas pressure not being able to concentrate on one spot, but being rapidly conducted along these pre-existent fissures, that is, along the planes of least resistance. If thus we were to admit the existence of the kimberlite dykes prior to the formation of the pipe, we could never explain the generally round and always sharply defined shape of the latter to have been the result of a violent explosion. Neither could the fissures end so abruptly into the pipes as they generally do, and the pipes would almost invariably be found to overlap and intrude upon the fissures. Basing our ideas on Daubree's theory, therefore (and we have no better to substitute for it at present), the fissure could not have been pre-existent to the pipe. Let us now investigate the contention which first originated this non-contemporanety theory. That pipe matter is non-existent in fissure magma is a statement I must reject as not being founded on sufficient proof. For apart from the fact that pipes have been more thoroughly explored than fissures and that consequently we have had more chance to find fissure matter in a pipe than vice versa, we must admit that the above contention is not borne out by facts. And Dr. Voit seems to acknowledge this himself, for he says "there is no doubt that in some cases pipe and fissure (dyke) rock resembles each other . . . and it would be very difficult sometimes to say from a hand specimen whether it belongs to a pipe or a fissure.". I think that we can henceforth safely eliminate the supposed non-existence of pipe rock in kimberlite dykes as an argument tending to prove the existence of the fissure prior to the formation of the pipe. It must be acknowledged, however, that in general pipe rock and dyke rock differ considerably mineralogically. Still there is no room for doubt that they belong to the very same magma. The magma, however, came up, cooled down, and crystallized in a very narrow recipient in the fissure, whilst it did so in a very much larger basin in the pipe. The injected kimberlite magma would cool down far more rapidly in a fissure than in a pipe, and a difference between the texture and the structure of the solidified magma of the pipe and that of the fissure would be the result; a difference similar to, although not so pronounced as that which exists between an effusive and a batholitic rock. The combinations of the constituting elements of a homogeneous magma in the way of crystallization are different in those parts of that magma which are subjected to different conditions, and the minerals engendered in the one part may thus be totally or nearly entirely absent in the other. Lastly, the experiments of Fremy and Morozewicz have clearly proved that minerals develop better and larger when allowed to crystallize in a large recipient than in a narrow one. This would explain the marked difference in the mineralogical constitution and in the size of the same constituent minerals of pipe kimberlite and dyke kimberlite. The presence of dyke kimberlite in pipes can easily and naturally be accounted for, as being the product of patches of kimberlite magma which were retarded in their crystallization and which only crystallized after the surrounding magma had already been solidified. Dykes must either have been contemporaneous or possibly older than the pipes, certainly never younger. Personally I am satisfied that they are contemporaneous. The main strike of the dykes is parallel to the direction of the axis of the folds of the region. The eclogites, I feel convinced, must be looked upon as segregations of the original kimberlite magma. With reference to the origin of diamonds, I think it very gratifying to note that the idea as expressed by Prof. A. Lacroix, some four weeks ago, is gradually gaining ground, and that before long we may definitely look upon this precious mineral as an original constituent of the kimberlite magma just the same as the garnets, pyroxenes, etc. The chips and fragments will then not longer be looked upon as so many pieces broken off of originally well-shaped crystals, the missing parts of which were conjured away, but simply as imperfectly crystallized diamonds.

The following contribution to the discussion on Dr. Voit's paper on "Kimberlite Dykes and Pipes," was made by Mr. J. P. Johnson:

Having myself spent much time in endeavoring to arrive at a solution of the many problems presented by the South African diamond pipes, I have read Dr. Voit's explanation of them with considerable interest. There are so many discrepancies, however, between my own observations and Dr. Voit's generalizations, that I fear we are still as far off the truth as ever. A fundamental point of difference between us is that relating to the nature of the pipe-rock. Dr. Voit maintains that it is a consolidated magma, and not a breccia, and that the eclogite masses are segregations in situ showing undoubted evidence of being a segregation from its matrix. My reasons for believing it to be a breccia are given in my "Note on Lherzolite and Eclogite Boulders from the Roberts

*Read before the Geological Society of South Africa.

Victor Mine." As regards the fissures, the megascopic characters of some of them certainly give the impression of an igneous rock. Whether this is confirmed by microscopic examination I am unaware. Perhaps Dr. Voit can produce slides in support of his statement that they are a consolidated magma. If it is indeed the case that some of these fissures are true igneous dykes then they may represent the initial stage of the particular type of volcanic activity with which we are dealing. The latter stages however were of a purely explosive nature. The filling of some at least of the fissures, and of all of the pipes with which I am acquainted, is clear of a fragmental nature. This fragmental rock is made up, partly of well-rounded pieces of the different known rocks through which the fissure or pipe has passed, but mostly of a finer matrix which seems to me to be the smashed up remains of a rock of which the lherzolite and eclogite boulders are the more resistant portions. Whether this rock originally entered the pipes as a molten magma and consolidated there, and was afterwards smashed up, or whether it entered the pipes as fragments of an already consolidated deep-seated formation, I still feel doubtful, but this much is certain that, as we now find them, the lherzolite and eclogite remnants are boulders pure and simple.

I must here utter a protest against Dr. Voit's comparison of eclogite "nodules" with the marcasite nodules found in some mines. One might just as well suggest an homologous relationship between ostrich eggs and cricket balls because they are both smooth on the outside. The above interpretation of the nature of the pipe material is, of course, totally at variance with Dr. Voit's idea that they are portions of laccoliths. But, apart from that, his reasons for regarding them as such seem to me decidedly weak. His contention is entirely based on the fact that the walls of the pipe sometimes overhang at the top, and that large masses of the surrounding strata frequently occur in the top portion. But surely a more rational explanation of this phenomenon is that the present top of the pipe is really very near the original outlet, and that these masses are merely rocks that have fallen back into the pipe, while the overhanging of the walls is due to the subsidence of the uptilted strata. In this connection it should be remembered that these masses sometimes come from a higher horizon than is represented in the pipe section, and that the sharp uptilting of the strata, which is so noticeable in many pipes, is confined to the top portion. There are some other statements in the paper which are incompatible with personally observed facts, and these I will deal with in the order in which they are presented. In paragraph 4, Dr. Voit, referring to the fissures, says: "None, or very few, foreign fragments occur in the rock." Yet the narrow Biesjesdam fissure abounds in granite, quartzite and other boulders; so that "rounded and brecciated fragments of exotic rocks such as gneisses, granites and crystalline schists" are not "indubitable evidences of a true pipe" (par. 9). Again, in page nine, he states that the mica, garnets and pyroxenes are more frequent and of larger size in the pipes. This also is refuted by the Biesjesdam fissure. Further on he says, "we cannot imagine that fragile minerals such as mica, enstatite, etc., has come from great depths, as in that case they would have been crushed to atoms in the ascending magma." The fact remains, however, that they occur in a fragmentary condition in the pipes, and that they have survived an even more violent treatment than the mere bringing up by a magma, namely, the long continued cup and ball action in the pipe, of which the well-rounded pebbles and boulders of hard rock are all indubitable proof. Another incorrect statement (page fifteen) is that "the eclogites, as well as the lherzolites, occur in very small quantity compared with the "exotic" boulders.

Whether Dr. Voit is justified in concluding that all fissures are older than pipes, because in some instances pieces of the fissure rock are found in the pipe, is more than doubtful when one considers the intermittent nature of volcanic phenomena. While if his contention that the fissure rock is an igneous dyke is correct, then even in those particular cases the fissures are not necessarily older in the geological sense of the word since they need not have been injected more than a week or two earlier. In concluding my remarks, I would venture the opinion that what is wanted at the present time is the collection of more exact data regarding the better exposed occurrences. Without that basis all attempts at generalization are bound to be futile.

Mr. Harger's Views.

Mr. H. S. Harger read an interesting paper at the last meeting of the Geological Society on the theories put forward by Dr. G. S. Corstorphine with regard to "the occurrence in kimberlite, of garnet-pyroxene nodules carrying diamonds." In concluding his paper, Mr. Harger said:

"Although I do not agree that all the pyroxenites and similar rocks are concretions, I admit that some of them might be; and think no hard and fast line should be drawn regarding the many kinds of ultra basic boulders, concretions, etc., which the ground contains. The mines vary greatly in their characteristics; some contain highly brecciated impure kimberlite of volcanic origin, which would not readily lend itself to magmatic segregation; and others contain a clear hard porphyritic kimberlite, which I certainly believe did lend itself to magmatic segregation. Whether or not the diamond crystallized in the magma after it reached the earth's surface still remains to be proved. Although I at one time like other geologists sought a different solution, owing to the alleged presence of broken diamonds in the blue, the study of kimberlite fissures in the last few years has inclined me towards Dr. Corstorphine's way of thinking, though the actual evidence he gives in support of his theory seems weak. When Dr. Corstorphine can examine his diamond-bearing pyroxenite in a hard blue ground or hard-bank and show marginal phenomena or orientation of minerals around a nucleus or some other unmistakable evidence of magmatic segregation, he will have gone a long way to settle the problem of the origin of diamonds; but it seems to me that opinions formed on boulders or nodules of pyroxenites and eclogites, which have weathered in the very soft yellow ground of the Roberts Victor mine, can hardly be accepted as conclusive, although very interesting and of great importance. In conclusion, I wish to thank Dr. Corstorphine for opening up a new and valuable field for geological thought and study in connection with the diamond formations of South Africa."

A few weeks ago a party of students of the Transvaal University College, under Prof. Yates, paid a visit to the laboratory of the Consolidated Gold Fields, Driehoek, and through the courtesy of Prof. MacArthur Johnson, were enabled to witness many interesting experiments. The chief features shown were: Concrete mixer and machine for testing the strength of cement blocks; machines for testing the tension, torson, and bending of wires of hoisting and hauling ropes apparatus for testing the lighting power and burning rate of candles; strength of explosives tests; fuse tests; oil tests; and microscopic examination of metals. It was a very interesting experimental study for the students and will aid them greatly in their practical work.

Arizona's Leadership in Copper Production

By Fitz-Mac.

Few people outside of the very best informed copper experts realize clearly the position of Arizona as a producer of the red metal.

It leads Michigan and at the rate of increase maintained for the last six years must inevitably lead Montana and stand indisputably first in the world within the next two years. The official figures tell the story in few words. Here they are compiled from the government report to 1905 (the last accessible) and from "Mineral Industry" for 1906.

PRODUCTION.

1901	—Arizona—	1906
126,000,000	...In Pounds...	263,000,000

Increase 137,000,000

—Michigan—

155,000,000 224,000,000

Increase 69,000,000.

—Montana—

230,000,000 300,000,000

Increase 70,000,000.

In 1906 the production of Montana exceeded the production of Arizona by only 37,000,000 pounds. But in 1901 the production of Montana exceeded that of Arizona by 114,000,000 pounds.

At that rate of increase Arizona should lead the world in two years more.

Arizona has a signal advantage over Michigan or Montana in the cost of producing its copper. Its deposits all lie, relatively to the copper deposits in those other two states, very close to the surface and the cost of mining is therefore very much less.

That is the primary reason of Arizona's remarkably rapid advance toward world leadership in the production of copper.

It is the cost of producing that determines the matter. Other things being equal the country that can produce its copper at the lowest cost will inevitably take the lead and that is distinctly the reason why Arizona is forging so rapidly to the front.

The sole question then is, can Arizona hold the relative pace she has struck—can she maintain her greater rate of increase over that of Montana and Michigan?

There seems to be no reasonable doubt that she can. Her copper resources appear to be as yet not more than fairly tapped. Up to six years ago Bisbee was a one-mine camp. It had only the great Copper Queen Now it has several large producers which are fair rivals of the great Copper Queen's record at the same stage of development.

Up to very recently Globe also has been a one-mine camp. The same is true of Jerome. Both are now coming to the front with several producers of large importance. The Clifton district is also expanding.

These four camps have made Arizona's copper history. But the new London-Kelvin district on the Gila river, twenty-five miles south of Globe, which has recently been opened up by the Phoenix & Easton railroad is the greatest copper field ever opened in Arizona in the extent of its deposits. It does not at present appear likely to rival Bisbee in the richness of its ores, but in the magnitude of its deposits it seems reasonably certain to prove itself without a rival in the copper history of Arizona.

It is a very large district, extending in a northwest direction from the extreme southern point of Gila county on the Gila river to the northern point of Pinal county and lying on both sides of the river. It therefore possesses an advantage over any mining district in the southwest in an abundance of constant water.

It is not new ground in the sense of being recently discovered. Its extensive copper deposits have long been known, but until the building of the Phoenix & Eastern railroad which follows the Gila river through the heart of the region, it has been too hopelessly remote from transportation to operate for copper. Years ago it was operated for silver and in the old Silver King contained the greatest silver mine ever opened in Arizona. A low priced metal like copper could not be worked under the disadvantages that would leave a large profit in a bonanza silver mine when silver had free and unlimited coinage.

The great copper fortunes of the near future will be made in this district. The properties are passing from feeble and inexperienced hands into the hands of parties strong in experience and strong in their ability to enlist capital in their enterprises.

There are several points of special prominence in the extensive developments inaugurated within the last year. The most prominent of these, so far is at Kelvin on the Gila and the railroad, though the principal mines are five to seven miles back.

A group of Colorado-Salt Lake mining men who have made great fortunes in operating on the low-grade copper ores of Bingham canon, Utah, have recently purchased the Old Ray property in Mineral creek canon near Kelvin. This is one of the most remarkable copper deposits in the world in that it lies (in practical effect) on top of the ground and can be mined by steam shovels, and the output is limited only by the milling capacity provided.

It is mostly a concentrating ore, but of great extent and value. Its concentrates will probably be smelted at the great metallurgical plant projected by the London-Arizona Copper Company, eight miles east on the Gila river and the railroad. This company has a great copper estate of its own, two and a half miles from its smelting plant and its ores are in the lime, like those of Bisbee, which it strongly resembles, and are therefore, perfectly self-fluxing. It is entirely a smelting proposition, while the ores at Ray and many other points are largely yellow sulphides, and therefore, concentrating propositions.

The metallurgical plant of the London-Arizona Copper Company, while planned primarily for the treatment of its own ores, will be able, by reason of its possessing a self-fluxing ore, to handle concentrates from surrounding mines with advantage to itself and a large saving in freight charges to them.

The "Lake Superior & Arizona Mining Company" which has a rich copper deposit running high in gold and silver near the famous old Silver King mine, thirty-five miles north of Florence, is building a railroad to connect its mines with a smelting plant of its own on the Gila, near Florence.

The London-Arizona Company is at the extreme eastern point of the new district, while the Lake Superior and Arizona is at the northwestern point of development, something like forty miles apart, with the great properties of the Troy, the Kelvin-Calumet and Ray Consolidated on the line between.

The Ray Consolidated and the London-Arizona are at present the two greatest copper prospects in Arizona, and if the extensive development inaugurated is energetically pushed the new district should within three to four years become the greatest copper producing section of Arizona. The Ray Consolidated and the London-Arizona will add a hundred million pounds a year to the territory's output and there are many other properties of great promise in the district.

It is the best prospecting ground in Arizona and winter is the prospector's season in this region. The hills are already beginning to swarm with them, incited by the success of prospectors last winter who have made nice little fortunes selling the locations they staked. Today the London-Kelvin district is the busiest mining scene in Arizona.

Mining Letters from Correspondents

Mines and Mining Wishes to Secure an Actual Reputable Correspondent from the Mining Centers of the World

Denver

October 23.—Miners throughout the state are extremely busy laying in their winter supplies, shipping their surplus ores, repairing their buildings and making extensive preparations for the approaching winter. All the mining camps of the state are in shape for active operations throughout the winter. The various districts of the San Juan were never as well prepared for a winter of profitable work as at the present time. And that will apply to northern Colorado as well. The dozen long tunnels of Clear Creek county will be pushed still further into the mountains, and the larger mines will more than output their normal tonnage, while dozens of minor properties will swing into line as steady producers.

Dredging and hydraulic placer operations will shut down in November in Summit county. But for the six months they have been in operation it is believed they have made a profitable record. Operations on the lode properties will be continued throughout the winter and they are in shape for increased activity.

The old districts of Boulder, Gilpin, Lake, Park, Chaffee, Teller, Custer, Eagle, Pitkin, Gunnison, Hinsdale, Mineral and other counties are well equipped for future activity.

The mines of Colorado have been short of men for the past twelve months, and throughout the busy season an aggregate of at least 5,000 more men could have been employed to advantage in the various mining districts. There appears to be a scarcity of labor in about all the industrial departments of the United States. With such a demand for labor, and its prices so remunerative, there certainly should be no grounds for strikes or other labor complications. All the industries of this country are making great headway and the demand for labor is steadily increasing. The wage scale is better than ever before in the history of the world, and labor complications should not become a stumbling block in the march of this mighty progress.

Before the Wyoming placer bubble has fairly sunk into nothingness up comes another nearer home. It is said to be a scheme by three or four Denver sharpers to defraud Uncle Sam out of a section of valuable timber by filing on it as mineral land. The charges have been brought to light by a protest filed by the government with Receiver Hugh Taylor of the local United States land office against the application made by three men for the land. The hearing, which is to take place within a few weeks, promises to teem with sensations. The allegations of the government will be supported by evidence obtained by two special agents working under M. D. McEnery of the special land office.

The land is situated near Kremmling, along the Moffat road, and comprises 1,000 acres of what the government says is timber land worth at least $30,000. Under the forest reserve policy the land was withheld from entry. Because of this bar, no entry would be received at he land office for it as timber land. To get around this restriction and to practice deception on the government, the men are averred to have made an application on the section as a placer claim.

It is the business of Mr. McEniry and his force to look out for illegal land entries and while the special agents were "nosing" around they heard suspicious reports about the so-called placer claim. Special Agent McGilvray and another agent were detailed or an investigation. They arrived at the section for which applications had been made and spent a day in making a thorough inspection of the ground. They found numerous sluices and ditches here and there. They observed those with interest, but what most attracted their attention were the movements of a man who seemed to be sprinkling seeds from a bag in his hand. On closer examination the agents discovered that the man was placing free gold in the sluices and ditches and distributing it around the surface of the grounds. They right away knew that he had got wind that an investigation was to be made and was salting the alleged placer field to deceive the shrewd eyes of the government's sleuths. Caught in the act, the man tried to laugh over the matter and assured the agents that he was only playing a little joke. The agents convinced him that they at least were not in a joking mood and began to collect evidence to sustain their charges. They dug far into the ground, but could find no signs of ore or any past signs of it. They put some of this soil in a bottle and also put some from the sluices which had been sprinkled with gold. They also secured a bag which had held some of the dust and from it obtained the name of the assayer from which the free gold had been purchased at $6 per bagfull.

Under the statutes it is said that the three men can be criminally prosecuted. No step of this sort, however, has been decided upon. It is not believed that in fighting the protest of the government, the applicants for the land will try to prove present mineral indications on the section, but will probably make an effort to show that by the vegetable decay and other evidences that the land at one time contained mineral deposits.

Reports from Colorado Springs state that 300 coal miners employed in the lignite mines of El Paso county walked out last Friday, because the operators refused to increase their wages and grant them an eight-hour working day. Engineers, pumpmen and timbermen will remain at work for the present in order to keep the mines in proper condition for the men to return to work in case the trouble is settled.

The average rate of increase asked for in wages is about ten per cent. and the men employed by the day ask that their hours be shortened from nine to eight. The machine men, who now receive 35 cents a ton, want 39½ cents, and the pickmen, who now get 57 cents a ton, want 62 cents. The other men engaged under ground demand $3 a day and the outside men $2.50 a day of eight hours.

The mines affected are owned by the Pike's Peak Fuel Company, Monument Valley Coal Company, Central Fuel Company, Curtis Coal Company and Keystone Coal Company.

It is undestood that all the companies have absolutely refused to consider the demands of the miners although all except the Curtis Company have expressed a willingness to meet the men and discuss the situation. They insist that it is impossible to grant the demands in whole or in any part.

The Colorado branch of the Western Association of Technical Chemists and Metallurgists, numbering 100, held a banquet at the Savoy a few evenings ago, with W. G. Smart, president of the Western Association a guest. The officers of the Colorado section are: Chairman W. D. Engle, Secretary, C. A. Rose, Treasurer O. J. Frost, and J. C. Ballar, G. C. Piwonka, J. W. Root, and F. W. Traphagen, directors. H. J. Baron, editor of the association journal, was also present.

The chief feature of the evening aside from the informal discussion, was an address by Dr. Victor C. Alderson, president of the School of Mines, on "The Importance of Research Work."

This is an organization composed of distingushed assayers, chemists, chemical engineers and men interested in this line of work. The Colorado section holds dinners annually and has been organized about three years. It has just ninety-nine members. The association has numerous branches, and individuals in all parts of the world belong, including British Columbia, India, Chile, Mexico and other lands.

Governor Buchtel a few days ago, named the delegates to the next annual convention of the American Mining Congress to be held at Joplin, Misouri, November 11th to 16th inclusive. They are as follows:

Ex-Governor Jesse McDonald, Leadville; William Lennox, Colorado Springs; A. E. Reynolds, Denver; General Bulkeley Wells, Telluride; E. J. Wilcox, Denver; W. J. Cox, Ouray; W. G. Swart, Denver; Frank Costello, Colorado Springs; Fred V. Bodfish, Victor; Thomas L. Wilkinson, Denver; William Bainbridge, Cripple Creek; A. V. Bohn, Leadville; W. Z. Kinney, Silverton; George J. Kimball, Jr., Idaho Springs; W. E. Passmore, Denver; William W. Travell, Victor; R. L. Martin, Central City; Prof. Arthur L. Hoskins, Golden; David Swickheimer, Rico; John R. Wood, Russell Gulch.

Sahueripa, Mexico

October 23.—A new strike has recently been made in the Cienequita Copper Company's mines, running on an average 364 ounces in silver and a high percentage in copper. Things are jumping in that vicinity now and the camp is very active.

The Cienequita is a highly meritorious mine and with the coming of railroad facilities will astonish the world. It has the ore in large quantities and it is of high grade. The railroad referred to is the Cananea Rio Yaqui and Pacific now completed to Beuena Vista; and before very long the tunnel now being constructed north of this place will be finished and the road in running order to Cornucopia and thence to Tonichi. This last named place will be the nearest station to the Cienequita property and other mines in the vicinity.

The smelter matte from this mine is now being sent to Chihuahua. Only a few days ago 125 mules loaded with matte took the trail over the mountains to San Ysidro, each loaded with a small fortune. About twenty-five mules go in a drove a day or two behind the other as there is not room in the mountain passes for a camp of more than that number. From San Ysidro the matte is sent on by rail. One can hardly appreciate the richness of the Cienequita. Everywhere there seems to be ore of high grade and not one, but half a score, of the ablest mining experts in the country pronounce it one of the largest of ore bodies in the country. Tests are made weekly by Manager Howbert of matte from the furnaces. A few days ago a matte test ran 670 ounces silver, $52 gold and over forty-nine per cent copper. Everything runs smoothly at this mine and scientific management and perfect system marks every movement. The mule trains that take away matte bring in merchandise to replenish the store which, by the way, would do credit to a city.

Sixteen tunnels are being driven into the mountains of red and white metal; and the red glare of the furnaces make the place look like hades at night, for night and day the work goes on. The output of this mine continues to increase and ere long those interested will wonder how they have suddenly become rich. All this time a quiet unassuming man, Mr. George Beebee, the president of the company, continues to guide the affairs of the outfit successfully for the benefit of all concerned. Conducting a big mine in a place so far away from a railroad, and conducting it sucessfully and profitably, is no easy task; yet this man is doing it. About him he has gathered faithful lieutenants. Every movement is watched; every dollar that comes in or goes out is accounted for, and sound business principles prevail.

Far away to the east nearly 200 miles lies Chihuahua, a city of 40,000 inhabitants and capital of a Mexican state of that name. It is to this point the matte of the Cienequita is sent—125 miles by pack mules to San Ysidro and the balance of the way by rail. It seems easy enough to say this; but when one takes into consideration this distance over mountain trails that would make the hair of a tenderfoot stand on end like "quills upon the fretful porcupine," the crossing of rivers and arroyas and other obstacles, it means much. With the advent of railroad facilities this will all be changed and it is estimated that several thousand more men will be at work in the district within the next two years. Mills and smelters will be built in this country between the Cienenquitas and the famous wide banked Yaqui river for the whole land is rich in mineral wealth waiting for the hand of man to pluck it from the womb of mother earth. This is no tale of fiction, but sober truth as thousands who have been in the country can testify.

At the present price of silver and copper more than twelve million dollars' worth of ore is blocked out and in sight, and nearly five miles of underground work has been done.

Patagonia, Ariz.

October 21.—A new strike has been made in the Mansfield mine in the Patagonia district. Crosscutting at the 250-foot level, they struck a vein of high grade ore running gold, silver and copper. They have penetrated the vein fifteen feet and not yet reached either wall. On the Black Cap vein the ore grows better and the quantity is increasing.

The Searchlight mine in this district about one and one half miles West of Patagonia, is being opened up successfully. The company is known as the Searchlight Gold and Copper Company, and it owns twelve claims. Three shafts are down about forty feet each all in ore. Carbonate copper ore is being taken out that runs from ten per cent to thirty per cent. with large showings of gold and silver. The company intends to extensively develop the property. The ledge is from 200 to 250 feet wide. The walls are granite and diorite. This property is in the foot hills of the Santa Rita mountains and all indications here, as elsewhere in the Patagonia region, point to a big mine when developed. No man can go amiss in this country if he goes down. P. J. McIntyre, of Nogales, is president and treasurer of the company and Phil Harvold, recorder of the county, of the same place, is secretary. M. F. Moore of Los Angeles, California, is general manager.

Patagonia is rustling these days and there is much to rustle for. It is destined to be a big and rich camp.

Joplin, Mo.

October 23.—The scenes in and about the headquarters of the American Mining Congress to meet here November 11th, is one of great activity. Meeting are held daily by the various committes on ways and plans.

Letters have been received from the governors of Illinois, Wisconsin, Arkansas, Mississippi, Nebraska and Kentucky, naming the delegates at large appointed by them from their respective states and commissioned to attend the meeting.

Word comes from the operators of northern Arkansas that they will place

on exhibit here during the session of the mining congress a fine collection of ores belonging to the Mine Operators' Association of that camp, that have been gathered from their mines. These gentlemen are now figuring with Mr. Rhorer, agent of the Missouri Pacific railroad for a Pullman car in which to travel and in which to live while they remain in Joplin. An admirable plan, as it brings their delegates together for consultation each day.

The committee on souvenirs have gotten out a beautiful book of 226 views, illustritating every important scene connected with zinc and lead mining, manufacturing plants, public buildings, street scenes, residences, tables of output, history, resources, transportation and maps of the district, a real work of art, to be preserved. A small box of specimens containing lead and zinc, forms another souvenir, also the picture postal card of mining scenes. Nor is the social phase of the congress forgotten, as several receptions, a musicale, and a grand ball have been planned, in fact every thing that will make for the comfort, pleasure, profit and instruction of the delegates in attendance has been done.

Among the men of prominence in the mining and engineering world will be John Hays Hammond of New York, recognized as the world's greatest engineer; W. R. Ingalls, who will report on the unification of the mining laws and Dr. H. F. Bain, state geologist of Illinois, and Herman B. Hesse, general superintendent of the Consolidation Coal Company of Frostburg, Maryland, will discuss the waste of the nation's resources, a question of vital interest to this district, as it is one of constant study how to save our ore values.

Already the state of Nevada says she wants to entertain the next session of the Mining Congress, and her delegates will attend in a body, coming in a special Pullman car from that state to Joplin.

Webb City camp has something new in the line of a concentrating mill to show the people attending this congress. It is built of structural steel and corrugated iron and is the first of its kind in the district, being built on the site of a frame mill that recently burned. The builders, the Southwestern Bridge Company of our city, believe that the steel mill is to become a great factor in the future of this camp, as the cost is but slightly above that of the old frame ones, and it has several advantages over it, one that is of real value is the elimination of the vibration in the hoist-house by the rigidity of the steel, the shafts are carried by big truss which is saving in power, the fire insurance will pay the interest on extra cost, and above all the mill can be taken down and moved by simply unbolting it. The mill will last for seventy-five years if it is kept painted. The plant building it employs 500 men, a fact not known to any of our home people.

Zinc has gained $1.00 in price this week over last, selling at $43.50; many are still holding for $44.00, and think a week will bring it.

Rapid City, South Dakota

October 23d.—The Chicago, Milwaukee & St. Paul railroad will announce its opening for business in the Black Hills on October 27th. Work at present consists in rushing to a completion the ballasting of the line. At Tacoma the road is practically finished, and it will require only a few more days at the gravel pits. A small stretch of road must yet be ballasted on the western portion of the line and workmen will be busy securing gravel from the Cheyenne river pits for the next ten days.

The distance from Rapid City to Chamberlain is 210 miles, which will be covered both ways by a daylight run.

This road becomes a competing line with the Chicago Northwestern, which has had a monopoly of the Black Hills business for twenty-five years. The Burlington has a line coming in from Denver, but this new road will give the Black Hills country a direct outlet by two great highways to the trade and commerce of the East.

Mexico City, Mexico

October 18th.—Important reforms in Mexican mining matters were discussed and decided to be carried out by the executive committtee of the Chamber of Mines assembled yesterday in its third session, with fifteen members present, to consider the draft of the new mining law. Firstly, it was unanimously agreed upon that a commission be appointed to present a petition to the government, opposing the increase of ore rates that the railroads wish to introduce in their tariffs. It was also resolved to oppose the ore classification measure which the railroads have in view, as under such a regime the books of the mining companies would be under the constant supervision of the transportation agents, a demand which is both unreasonable and unnecessary.

On the recommendation of Lic. Sarlos Robles of Guanajuato, efforts will be made to constitute the option contract, a form of transaction now very widely used in Mexico, a legal contractual obligation and thus put a stop to the random shifts which have been made to serve the purpose so far, thereby placing such ventures on a very precarious footing.

Thefts of ores by mine operatives likewise came under consideration, this being chiefly due to persons located in almost every camp who buy ore from whomever will sell and ask no questions. Rules and penalties, it was thought, should be enacted for the suppression of such traffic. It is a source of exasperation to mine owners and of continual leakage in the profits.

The chapter of the law dealing with responsibility for mine accidents was a subject of lengthy discussion and many alterations were deemed necessary in this most important branch of minig legislation. The principal improvement advocated was the demand for a more rigorous inspection of the mines, a measure which cannot be too highly encouraged when one recalls the inexcusable blunders, the fatal carelessness that have resulted in the wholesale destruction of human life. The proverbial ounce of prevention can never be compensated by any weight of cure.

The point most strenuously insisted upon in the session was moderation in the railroad charges, since together with the slump in the metal market, it is alleged that the proposed rates would be the final straw needed to break the camel's back, entailing in many cases the shutdown of mines and the consequent loss of employment to a great number of men.

Brigadier General George F. Elliot, commander of the United States marine corps, who has just returned from an extensive trip through the great northwest, says the gold fever has broken out anew at Sitka. They have recently uncovered a rich vein on an island forty-five miles from Sitka, which yields a heavy percentage of leaf gold and active preparations are being made for its development. As a result of this discovery the forty-five marines whom General Elliott had intended to order to some other point will remain to preserve order in what is rapidly becoming one of the "boom" towns of Alaska.

The story of the discovery as told to General Elliot is that two Indians, while fishing noticed particles of gold. They told the news to a Presbyterian clergyman at Sitka. A company opened the vein of quartz and succeeded in mining and transporting to Sitka in canoes ninety tons of ore. This one shipment yielded, after payment of freight, more than $16,000. The knowledge of the find at the island soon became known in Sitka and the island is now practically all staked out by gold seekers.

Movements in Mining Camps of World

Only Authenticated Reports Will Be Admitted to These Columns

COLORADO

Clear Creek.—Preparations for the winter are now occupying the attention of miners of this section. Repairing of machinery, laying in provisions, marketing of surplus ores, constitute the chief work that is being carried on. The Clear Creek mines were never before in better condition for the winter's campaign than they are at present.—The Vidler tunnel will be pushed through during the coming season, and another year will see dayligth streaming through from Clear Creek county to Summit county. It is understood that a dozen valuable ore bodies have been already cut in the long bore, which, on the completion, of the tunnel, will be extensively developed. Only 1,000 feet remain to be driven.—The East Argentine Mining Company is said to have drilled its Sydney tunnel with less cost than any similar proposition in the county, the entire outlay on the first 1,000 feet not exceeding $10,000 and the subsequent expense being not more than $6 per foot. The management reports a heavy tonnage from the blind lode intersected at a distance of 2,125 feet from the portal. The Sydney tunnel has now reached a length of 2,700 feet, progress being made at the rate of six or seven feet a day.—A strike made in carrying a stope at a depth of 2,000 feet in the Cram lode is a great encouragement to the miners of this section. The shoot is eighteen inches in thickness, and runs about $32 to the ton in gold, silver, lead and copper.

Hinsdale County.—The Burrows Park Mines Company made lately a fine shipment of silver, lead and copper ores taken from the Genesseee-Neodesha group.—A. E. Reynolds, leasing on the Old Frank Hough mine on the Lake City slope from the Thatcher brothers in Pueblo, is shipping silver, lead and copper ore of good quality.—It is reported that the Palmetto, Wyoming and Polar Star on and near Engineer mountain will be revived.—A temporary shutdown has been ordered by Manager Martin on the More mine.—A vein of about three feet has been reached by the crosscut on the Highland Chief, and stoping will soon be inaugurated. The new tram is near completion.—On the Dick Dawson property a fine body of copper and lead has been reached by George Vernon and sons.

Lake County.—An electric pump is to be installed in the Ready Cash tunnel of the Aurora Mining Company, for the purpose of sinking an interior shaft.—Good assays have been found in one of the old tunnels of the Long and Derry property, which is being equipped with modern machinery to prosecute vigorous development.—A set of equipment is being installed by the owners of the Tip Top and other properties in Horseshoe.—The Mammoth shaft in Big Evans gulch has a vein from two to four feet wide, yielding ninety ounces of silver and from 15 to 20 per cent. lead, several sacks of which are being taken out.—Railroad and other iron in the bottom of the drill hole of the Neusitz placer, has just put a stop to operations on that property.—The Joy group, two miles west of St. Kevin worked by Albert Fennel, is turning out ore that samples four ounces in gold and twelve per cent copper.—By the end of next month the various mining camps around Leadville will be supplied with electric power.—The International Mining Company, has struck two very promising ore shoots, one at 1,100 feet, and another at 1,157 feet.—The Shamus O'Brien, on Yankee hill, one of the early bonanzas, has been leased to Andrew Clooney and associates.—At the Ximo placer a very satisfactory clean-up is reported.—Several tons of concentrates and high grade ore are being turned out daily from the Ruby property in Lincoln gulch.—The Nichols brothers of Lincoln gulch are running into excellent lead deposits on the Sailor Boy.—Surface ores that run as high as $200 per ton, are causing Park, Penley and Foley to bore a new tunnel on the Mascot.—The Independence group, Sayers' gulch, has been leased to W. E. N. Wright and Viggo Jensen, of Denmark, from George J. Kindel and associates. Four tunnels have been driven, three on the vein, and the lowest being a crosscut. The vein, ten feet wide at the outcropping, averages $8 per ton.

San Juan County.—A recent strike made by John Carver on the Blizzard group of six claims in Dry gulch, indicates a prosperous future for that property. A body of ore twenty-five feet in width was met in the Blizzard, and another almost as large, in the Badger, also of the group. The ore averages $58 to the ton in gold, silver and copper values.—The Tip Top, one of fourteen claims near the old Sunnyside mill, from a crosscut vein thirty feet wide, is producing ore, one grade of which runs $41.60 in gold, and another at $20 to the ton.—John W. Vickers of Lake City, has opened up on the Josephine, in Cinnamon Basin, a four-foot vein that yields from $50 to $100 in gold.—The Benson tunnel on Galena mountain is now in a distance of 1,600 feet.

Summit County.—The town of Montezuma seems to be enjoying a genuine mining boom, since the improved transportation facilities. The Montezuma Mines Development Company, owning 3,000 acres of promising mineral territory is one of the most active companies in the field with its properties all steadily producing under competent management and up-to-date appliances.—The Sarsfield Silver Mining Company, owning twenty-five claims on Collier mountain, has effected 1,000 feet of development, which show several thousand tons of ore, averaging for its shipping material, $115 and for its milling, $20 per ton in silver, lead and zinc.—The Montezuma Milling and Transportation Company is to enlarge its 100-ton mill to a 500-ton capacity and to build a twelve mile tram system.—The Montezuma Power and Light Company is installing a power plant below Montezuma for the mill and King mine.—The Montezuma Smelting and Refining Company, lately incorporated, owns 400 acres of manganese deposits, and 400 acres of good fluxing lime. This company is to erect a smelter in the near future for the purpose of treating ores from the adjacent mines.—The Columbine Silver Mines Company, owning fifty-five claims, on which 1,000 feet of development has been accomplished, has a pay streak, eighteen inches to five feet in width, which runs $32 to the ton in lead and copper unsorted. The sorted ore assays at $60 to $70.—The Excelsior, Frisco, the property of Frank Wiborg of Cincinnati, is now making shipments.—The Square Deal tunnel in Chief mountain is being pushed to cross-cut the veins discovered on the surface some years ago.—At the mouth of the Swan river the Colorado Gold Dredging Company is constructing two immense gold dredging boats, each estimated to cost in the neighborhood of $105,000.—The Colorado & Southern road will, in the coming spring, lay an extension from Keystone to Montezuma, thus probably putting a stop to further advance of the Argentine Central.

ARIZONA

Cochise County—The Tabatacochi mine of Vicroy and Fife, at a depth of 360 feet has a three-foot ledge of high running ore.—The Copper Queen reduction plant continues operations with one fourth the men employed and nine furnaces receiving ore. The output for September was 300,000 tons.—Three furnaces at the Calumet and Arizona smelter are treating copper; the old furnaces are to be enlarged and two new ones of 500 tons capacity each to be added. The final work on the new power house has been almost perfected.—The Octave Mining Company, after sinking a 350-foot shaft on the Joker claim, made a clear profit of $2,000 with ore in sight to supply the forty-ton mill to its full capacity for a year. The Octave mine of the same company has a shoot of ore two and a half feet in thckness that assays $18 to $50 to the ton.—San Francisco capitalists have made the final payment of $15,000 on the Mayflower mine near Dragoon, formerly owned by George Scherrer and wife and Louis Ezekiels.—Robinson and Wilson have property on the San Pedro that runs forty per cent. in copper.—The Shattuck-Arizona is shipping about 200 tons of sulphide ores to Globe. Its surface equipment is giving the highest satisfaction.—The Wolverine under an energetic management is bringing out good quantities of ten per cent. ore.—The shaft on the North Bisbee Development ground is down sixty-five feet, work having been resumed.—The Superior-Bonanza Mining Company has acquired the Sonora-Bonanza mines, near Imuris.—Ore near the surface has been found on the claims of J. F. Kelly and F. Frazee, in the western part of the district.—The force on the Superior and Pittsburg mines will not be diminished, but in pursuance of a policy adopted by almost all the copper holders, development work, not shipment, will be its program for some time.

Gila County—An up-to-date electric plant is to be installed for the purpose of lighting their mine, by the Old Dominion Company. To make room, the boilers of the smelter are being relegated to the rear of the building where two new Sterling boilers will be added to the battery. By this innovation, Globe will have the most thoroughly equipped plant in the state.—The Saddle Mountain Mining Co. will soon begin the erection of its smelter on the Phoenix and Eastern railroad track. A mile-long tunnel, joining the shaft at the 800-foot level, will bring the ores to the furnaces with very little expense.—A metal known as Modoc gold or Roman alloy, was found in the Gila range by a prospector named A. B. Broadhead who, on account of its close similarity to gold, took a specimen to the Columbia university to be analyzed, where he was told that his find was the only one known in this country.—The Copper Hill mine is being worked with lessened forces.—The Globe Consolidated mine is progressing steadily and its Gem shaft is at a depth of 1,025 feet.

Graham County—The Royal Tinto Mining and smelting Company is constructing a road from its property to the Aravapai post office.—The Mammoth tunnel in the Graham mountains, near Safford, according to report, is in the near future to change hands, the purchase price being a million and a half dollars.—The officers of the Home Copper Company have decided to renew operations on their ground by probing for values with a diamond drill.—The Oregon shaft of the Clifton Gold and Copper Company is yielding very satisfactory profits and is thought likely to extend to the famous Longfellow lead.—The Campbell brothers, with claims this side of Morenci, made a gold strike recently that assayed $1,000 to the ton.—The new 1,000-ton Shannon furnace is now handling forty tons of copper daily, it being deemed not advisable to push the plant to its full capacity until running in perfect order. A large accumulation of ore during the delay of its improvement will afford ample test material. The rumor that the comapny had curtailed its pay roll is without foundation.—The low copper market has caused the shutting down of the Copper King mine above Clifton, belonging to the New England and Copper Company. This will cut down the company's former shipment of 1,500 tons monthly to 1,000 monthly. A tram will soon be completed from the Antietam group of the New England people to the Shannon incline.

Maricopa County.—The property of S. D. Gardon, twelve miles east of Florence, is being developed by a crew of men turning out copper that samples twenty per cent.

Navaho County.—Gold and silver ore running $150 to the ton has been struck ten miles south of the Navaho Indian reservation and numbers of prospectors are flocking to the point.

Pima County.—The Tuscon Consolidated Mining Company has shipped from a surface tunnel on the old Pueblo property a carload of ore sampling twelve per cent. copper and gold values of between $2 and $20 per ton. A second car is being filled from the 150 foot inclined shaft showing $20 in gold and eight per cent. copper.—The new seven horse power hoist of the Plumed Knight mines is installed and with a full equipment of men will hoist fifty tons of ore daily.—In the last two months 500 tons of high-grade copper ore have been shipped to the Douglas smelter from these claims, netting the owners a profit of $1,000.

Pinal county.—A trestle across Copper Canyon near Ray, has been completed, connecting the concentrating plant of the old Kelvin Reduction Company with the Madaline shaft of the Kelvin-Calumet Company. The mill will be soon in operation treating sixty tons of ore in twenty-four hours, so that the company with its other mill, which also treats sixty tons in twenty-four hours, will be able to henceforth handle 120 tons of ore daily.—Some very large bodies of ore are being opened on the holdings of the Arizona Mining Company, and work will not be slackened on account of the decline in the price of copper.—The new gasoline hoist at the Red Hills camp is installed and bringing out some high grade copper.—A party of Los Angeles men is investigating the Red Hills district, with a view to buying.—In two weeks the boiler, hoist and compressor at the Oklahoma shaft will have been set up, and sinking will be commenced.—Having sold considerable stock at $6 per share, the London Arizona Copper Company is preparing to institute development on a large scale, the plans for a smelter having been completed. The installation of new machinery and the building of a shaft house down to the 100 foot level, is under full headway.

Santa Cruz County.—The Patagonia Mining Company has acquired a lease on the Flux and Hardshell mines controlled by R. R. Richardson. The Flux workings consist of a 250 foot shaft joining a 600 foot tunnel, paying satisfactorily in silver and lead, with some gold, copper and zinc.

Yavapai County.—The Ideal mine at its fifty foot level has struck a rich shoot of ore. A new hoist is soon to be installed by the Eagle Consolidated Mines Company.—A shipment from the Logus group of forty claims on Big Bug Creek realized eighteen per cent. in copper besides good gold and silver values.—The Arizona Placer Company, lately organized with W. A. Bondurant of Los Angeles as general manager, has purchased 2,000 acres on Blind Indian creek, the store at Wagoner, the town site and other property nearby. The ground is said to contain high values in gold. One hundred thousand feet of lumber are to be shipped from Kirkland with which to build a flume from a branch of the Blind Indian.—A fifty ounce bar of gold was brought into Prescott recently from the Inpendence group in the Jersey Lily sec-

tion. The mines are controlled by Carpenter, Foster, Hughes and Anderson, and ore treated by the cyanide process yields about $16 per ton, mainly gold. —Homer R. Wood, W. Lawlor, J. Pickrell and Van H. Brooks, recorded their titles on thirty-seven claims covering 640 acres near Mountain Springs, and known as the Combination group. The surface workings show a good promise of copper.—A strike was declared on the Verde Grande October 10th, over the discharge of the foreman. It is soon, however, to be adjusted.—A fifteen-foot body of gold and silver ore below the 600 foot level of the shaft on the Little Daisy claim of the United Verde Extension Company, sampling at $25 per ton, has created quite a stir among Jerome mining men.—Another important strike contemporaneous with the last mentioned was made in the drift south from the 450 level in the 1888 shaft on the Hull Copper Company's group.—At a depth of 630 feet nine feet of high-grade ore hos been exposed on the Black hills group belonging to Thoams brothers and Metcalfe.—A large, powerful and up-to-date plant is being purchased in San Francisco for the Harryhousen property.—The Eureka mine is being steadily developed under contractor Frank Desault.

NEW MEXICO

Grant County.—The Martinburg claim, one of nine belonging to Brown & Company, on Cherry creek, shows at the bottom of its sixty foot shaft. sulphide ore carrying ten per cent. copper.—Three claims on the famous Carlisle lead have been leased to H. C. E. Spence of Steeple Rock. Development on the Philadelphia, Hanover, is being actively continued despite the fall in copper, the main shaft having now reached a depth of 125 feet.—The Hermosa company is putting in a new hoisting engine on the Treasure vault, Santa Rita.—Machinery has been ordered to develop the property of the Columbia Copper Mining Company Santa Rita. The company possesses thirty claims in the most productive section of the copper belt of Santa Rita.—Preparations are being made to install a hoisting machine on the Osceola property, San Jose, belonging to Walter Rogers of El Paso. Good copper ore is in sight in the shaft on the Osceola.

Socorro County.—The Last Chance near Silver City, is producing $540,000 a year.—The Top Mining Company is installing an air-compressor on thoroughly up-to-date lines.—Cooney and Weatherby have received permits from the government for cutting 8,000 cords of wood, and also several thousand feet of saw timber, with which it is said they will construct a 500 horse-power water plant on Whitewater creek.—The Little Fannie, the Maud S., and the Confidence mines are soon to resume operations.

SOUTH DAKOTA

Lawrence County.—The Imperial Mining Company is employing about 100 men on the Baltimore, Dolphin, Monday and Dakota mines and on the Imperial mill. The Dakota mill is to be revamped and enlarged to 150 tons' capacity. It will receive power from the Black Hills Traction Company. As soon as the machinery arrives the Wasp No. 2 will also take a current from the Traction Company. With forty men engaged the mill is now running through 190 tons a day.—The Portland and Clinton companies are working on the lower contact, while a lease is being extended on the upper contact.—The Black Hills Traction Company has completed its plant, a few poles remaining to be put up.—The Westinghouse company is increasing its mica holdings in the southern hills, keeping a large force at work extending its open cut work and sinking its double compartment shaft at a rapid rate.—The Reliance Gold Mining Company of Deadwood, operating on Annie creek, is about to build an air compressor house, a residence for the mill superintendent and to purchase ten air drills and another rolling mill, involving an expenditure of about $10,000.—State Mine Inspector Nick Treweek and associates have taken a lease on the Mohawk and Mary group at the head of Spruce gulch near Deadwood. The property consisting of 200 acres shows a vein of gold and silver running for a distance of 1,200 feet that assays from $15 to $40 a ton.—The Hercules Mining Company has bought the Borsch property in Galena and moved its assay office to that locality. A force of eighteen men is working on the Ruby Gulch property and a larger number in Butcher Gulch. Gold and silver of high grade are being produced.—A new compressed air hoist just received from Denver is being installed on the Hoodoo shaft of the Branch Mint Company at Galena. The plant costing $5,000, is a forty horse-power, double cylinder, single arm drum, that will lift a maximum weight of 4,000 pounds at the rate of 400 feet per minute.—The Great Northern Gold Mining & Milling Company, recently organized, John Wagner, president, has thirty acres in the richest mining section of the Black hills, lying south of the Penobscot and due north of the Globe property at Maitland.. Its main development has been on the Jenney claims and on the Jenney fraction, Chalk No. 1, and Chalk No. 2, whence the average value has been $6.50 per ton. It is the intention of the company to erect and have in operation a milling plant within the coming year.—The Jupiter mine in the Blacktail district is soon to be pumped out and the old mill to be renovated and improved. A tunnel is being drilled through to the Kicking Horse group of claims further up the gulch, where crushers will be installed and the product shipped through a pipe line to Deadwood.—The Montana Mining & Milling Company has purchased the property of Bert Heath, at Nahant, extending over 300 acres and showing an ore value of $4 per ton. The company, composed largely of eastern men, will purchase a complete set of modern mill machinery as soon as the ore has been more extensively developed.—The third tin strike in the Black Hills has been made by John Mattes, who found the metal in amblygonite rock, a matrix of which has never before been known to contain tin. Several eastern capitalists have been examining the recent tin finds, and it is believed that extensive exploitation of this metal will be inaugurated in the Black Hills.

MEXICO

Aguascalientes.—The copper mines of the Aguascalientes Metal Company, with an average output for several years of 2,000 tons monthly, have been shut down because of the low price of copper.—The San Francisca mine, at Asientos, is still on fire in its main shaft and all efforts to extinguish the flames are of no avail.

Chihuahua.—Four feet of ore running $100 to the ton in gold, are reported to have been encountered on the 700-foot level of the Matulera mine of the Greene Gold-Silver Company.—The Southern Mining Company has contracted for the building of a small five-stamp mill and cyanide plant to serve as experiment works for its Margarita mine in the Ocampo district.—The Chicago-Mexican Consolidated Mining Company, operating beyond Cusihuiriachi, has also ordered a five-stamp mill and concentrating plant.—The Minas Jobosa y Anex, near Jimenez, has shut down because of the poor copper market.

Durango.—The mines of the Velardena Mining & Smelting Company, a Guggenheim concern, have suspended operations till the copper market shows signs of resuscitating.

Guanajuato.—The El Roble mine, in

the Guanajuato mining camp, San Cayetano district, owned by James Corwin and Texas bankers, shows two rich ore veins out of which several thousand dollars' worth of mineral has been blocked out. The installation of new machinery and other improvements are under discussion.—English capital, it is reported, will operate the Solomon and David mines in Guanajuato.—In the Los Reyes mine, Guanajuato, a promising vein has been uncovered.—A zone of virgin ore, hitherto overlooked, has been struck in the Santa Rosa belt.—Denouncements have been made by M. K. Taylor, C. Resadi and F. Drivat on mineral land near Guanajuato.

Jalisco.—Seventy-six claims have been sold by Pedro Duran de Armis to an American company for $200,000. The Doerr brothers of Aguascalientes, the reputed purchasers, have been in Lagos inspecting the mine, with a view to installing a small mill and other mining apparatus.

Oaxaca.—Buildings are being erected on the Orinoco property in the Taviche district for the purpose of making this spot a permanent camp.—Ore that samples fifteen per cent. lead and nearly a kilo of silver has been found in the Magdalena mines.—In the Treadwell mine, Taviche, a copper vein one meter wide, running five per cent., has been encountered in the west drift, a continuation of that lately found in the east drift.—The Cornejo Blanco mine, Taviche, has been averaging seventy-five to eighty-five tons of paying ore for several months.—Miners are being attracted to the Noxhixtlan district by the success of the El Socorro mine.

Sonora.—On the Sulphine of the Fay-Cananea ore has been encountered in the crosscut, 110 feet from the shaft, on the first level.—Crosscuts are being made in the Azurite to determine the width of the ore body.—The properties of J. H. Mitchell and associates in the Magdalena district are soon to be under development. They contain a five-foot vein, with an eight-inch pay streak of silver.—The Steech shaft is also being actively operated, a crosscut being drilled from the 200-foot level.—Sixty-four pertinencias, known as the La Piamonte group, near Cananea, have been bought for the sum of $25,000 from Frisco Arnaldo by the Calumet & Sonora Company.—Ore averaging 7.2 ounces silver, 10.72 ounces gold and 34 per cent. lead to the ton has been encountered at the Hole mine of D. T. Green and J. A. Wilson and situated two miles from Ojo de Agua.—G. C. Eastman disposed of his interests in the Golondrina Mining Company, amounting to 11,000 shares, to the president of the company. Mr. Eastman will henceforth devote himself to the development of the San Francisco and Fortuna properties.—A. S. Dwight and J. H. Devereux have ordered new machinery for the Noche Bueno group in the Manzanal mountains. It is reported that a larger force of men will be employed on this property.—Development on a large scale will be inaugurated by the Southwestern Mining Company on their Ortega property.—Wagon shortage is delaying the output of the Las Chispas. The famous Arizpe mine produced last month fifty tons of concentrating matter and from sixty to seventy tons of high-grade shipping ore.—The mill at the El Tigre mine is steadily being raised and a thirty-six mile wagon road from the mine to Ysabel is well under way.—The furnace at the Democrata mine, now building, will have, when completed, a daily capacity of 250 tons.—Ore has been encountered on the Norton claim carrying 100 ounces of silver, two per cent. copper and some lead and gold.—J. E. Young, auditor of the Oro Maximo Mining Company, stated that work will soon be resumed on the company's ground.—Ore brought in from the La Sierra de Los Ajos property of the Santa Elina Mining & Annex Company, situated in the Ajos mountains, assayed at $8,000 to the ton in gold and silver and was taken from a vein a foot wide. Extensive exploitation of the property will be undertaken.—The Mercedes Mining Company, controlled by Franklin & Smith of Nogales, Arizona, has its main shaft down to a depth of 200 feet, where it has struck ten to twelve per cent. copper ore.

Tin in South Africa

Dr. Voit's Geology.

"The tin occurs as cassiterite in pockets, small pipe and cylinder-shaped vests or veins, which, however, have apparently no great extension, and are inclined to pinch out towards depth and to reopen again. The tin is always connected with granite zones, decidedly different from the main bulk of the granite, and there seems to me to be no regularity in the deposits, which are distributed rather erratically over the zones of impregnation. There seems to be little doubt that the tin was brought into the granite at a later period, long after the solidification of the granite. The occurrence has been described as being contemperaneous and of a segregational character in the original granite magma. This, however, is entirely wrong, for in this case the tin would not be connected with certain zones of a very finely grained granite, as, de facto, it is; but it would be connected with the basic and altrabasic variations of the granite magma which we find towards the contact with either Pretoria beds or Waterberg sandstone. The impregnation with tin is due, no doubt, to which formed certain zones in the original granite. That in these later intrusions the cassiterite may form sometimes segregations is perfectly within the limits of possibility, though I think that even here we have to do with later impregnations of tin and associated minerals, due to secondary exhalations and aqueous extrusions along a certain zone still semi-plastic. Only in this case can we explain that the Pretoria sandstones in tin areas have been found to contain cassiterite in considerable quantities. The occurence of tin in the Pretoria beds is, beyond doubt, connected with this latter fructification of the granite which intruded in the Pretoria beds, and sent the extruding gases and solutions from the younger granite zones into the adjoining and overlying sedimentary beds. Now, the question arises whether the Waterberg sandstone has the same chances as the Pretoria beds in the granite areas. It seems to be beyond all doubt that the granite is intrusive not alone in the Pretoria beds, but also in the Waterberg sandstone. In fact, the upper beds of the Waterberg sandstone have apparently formed the roof of the granite-batholites. Now, in the granite west of Pietpotgietersrust we can observe two different zones of a younger granite, representing those zones in which we find the impregnations with cassiterite; both zones seem to run fairly parallel from north-north-east to south south-west, the zone Appingendam-Zaaiplaats and the zone Groenfontein Solomon's Temple. Of the two zones, the one Appingendam-Zaaiplaasts runs right into the farm Waterval, and as the granite is overlaid in the northern and north-eastern portion of the farm by Waterberg sandstone at apparently no great thickness, the possibility exists of cassiterite deposits being found on the farm, especially as tin occurs in the small spruits in the northern portion of the farm.

New York Sub-Treasury.

	Oct. 19.	Since Friday
Paid to Banks...	$3,659,000	$7,915,000
Recd from Banks	3,554,000	7,940,000
Banks gained ...	105,000	
Banks lost		25,000

The sub-treasury was creditor at the clearing house on Monday $444,203. There were no important items. The banks have lost to the sub-treasury since Friday $25,000 and for the same period the sub-treasury was debtor at the clearing house $866,689.

Coal Mining and Its Branches

Those Interested in the Coal Industry in the Rocky Mountains are Requested to send Mines and Mining Reliable Information on all Subjects of Interest to the Coal Trade

Denver Will Have Cheap Coal

A half dozen coal companies have been organized recently to develop a large tract of coal land only twenty to twenty-five miles from Denver. Six new mines are being opened, three new towns have been started and these companies propose to be in shape within a few months to produce at least 5,000 tons a day of as good a quality of domestic lignite coal as there is in this country. The new field has the Union Pacific railroad at its doors and the output will be by independent companies.

The new companies are the following: The Consolidated Coal and Coke Company of Dacono; the Denslow Coal and Land Company of Frederick; the Warwick Coal and Investment Company of Frederick; the Grant Coal Company of Frederick; the Evans Coal and Land Company of Frederick; the Frederick Coal Company of Frederick. The new towns are Firestone, Frederick and Dacono.

Only one mine, the Baum, of the Consolidated Coal and Coke Company, is as yet connected by the railroad and shipping, but workmen are busy laying tracks and by the first of the year all of the above mines will be shipping coal. In addition, several other shafts are in contemplation and within a year there will be at least a dozen big mines outputting coal from this section.

The new field embraces a section of country about six miles wide by ten miles long. It is located in the south western corner of Weld county, six miles directly west of Fort Lupton eight miles north of Greeley and about ten miles east of Longmont.

While it is called a new field, the fact that it was underlaid with coal has been well known for years, but owing to the fact that the Union Pacific would not provide tracks no development has ever been made. The field is really a continuation of the Louisville and Lafayette field, which has supplied Denver with domestic coal for so many years.

With the opening of the new mines there has been a flood of people pouring into the new district. The town of Dacono was established by the Consolidated Coal Company for the housing of its employes. The Frederick Coal Company established the town of Frederick, a half-mile to the north, and the Denslow Coal and Land Company established the town of Firestone, still a half-mile farther north. All of these three towns have come into existence during the past year, there being practically no sign of them in April last. Dacono has the depot on the Union Pacific branch. Firestone has the postoffice and Frederick is legging for the school. Frederick, located midway between the other two towns, seems to be making the most active growth, as it has three of the new mines almost within the town limits. Frederick now has two general stores, two hotels, a laundry, a lumber yard, a machine shop, doctor and barber shop, and a first-class livery and feed stable. Its population now is about 200, but it is increasing so rapidly that it is predicted that there will be a thousand people there before the first of the year or shortly after. The only difficulty is to get houses erected rapidly enough. Building material is being rushed in as rapidly as possible. A waterworks is being put in and plans are being made for electric light. There will be required 1,000 to 1,200 miners to operate the mines now being opened and these will give the three towns, which will probably ultimately become one, a population of from 3,000 to 4,000 people.

As to the effect of the opening of this new district upon the Denver coal supply, it is too early yet to say. The trust is beginning to take notice and will undoubtedly make an effort to control the supply or to at least turn it away from Denver. All of the operators have had offers from the trust companies to buy their output, but as yet nothing has been done, though it is reported that the Rocky Mountain Fuel Company is handling the coal from the Warwick mine in the Denver market. The operators in the new field have good financial backing and will be in shape to push their coal both in Denver and elsewhere, but it is claimed that the demand in Kansas and Nebraska on the Union Pacific will easily absorb the whole output this winter.

New York, Kansas City and Denver are supplying the capital for the development of the new field. The Consolidated Coal and Coke Company is composed of Denver men—C. L. Baum, president; J. E. Baum, vice president, and S. C. Dimm, secretary.

The Denslow Coal and Land Company is headed by George Denslow, a well-known capitalist of Kansas City, and Everett B. Curtis of Denver, is the general manager. This company has a shaft down 106 feet to a seven foot vein of coal. Below this vein is another vein of eight and one-half feet.

The Warwick Coal and Investment company is operating on leased land. It is composed of three practical coal men, William Whiles, Ernest and Joseph Whiles. They have a fine shaft down 170 feet and will operate the lower vein of eight feet. This company is ready to commence shipping as soon as it is connected with the railroad, which will be within a few weeks, as the construction of the switch is now under way.

The Frederick Coal Company is headed by A. G. Reynolds of Littleton, who owns the land. William Saunders and his son, Edward Saunders, are operating the mine. A slope has been constructed to the coal instead of a shaft and extensive upper works are being constructed. The slope is now in the coal and development is proceeding, some coal being shipped already. This company also owns the Frederick townsite.

The Grant Coal Company is developing the north end of the field, taking in the old McKissick property. It is headed and controlled by R. S. Grant, a capitalist of New York city. A fine shaft has been constructed 145 feet to the top of the coal and a ten and one-half foot vein of fine coal is being opened. The railroad tracks are already in and as soon as the top works can be constructed and machinery installed this mine will be ready for business. It will have a hoisting capacity of over 1,200 tons per day.

The Evans Coal and Land Company is developing a shaft right in the town of Frederick. This company is composed of a number of strong coal men of years of experience in the Colorado field. The officers are D. E. Evans of Denver, president; Guy Fox of Boulder, vice president; J. H. Denmire, secretary and M. V. Johnson of Denver, treasurer. This company has an addition to the town of Frederick and is erecting homes for its men. It is sinking a shaft to the lower vein of coal and will be in operation by the first of the year. The company owns its own land and is preparing to operate on a large scale. All of these men have been operating in the Louisville and Lafayette district for years and are convinced that the coal in the new field is in many

ways superior to the coal taken from the old district.

This whole section seems to be underlaid with several veins of coal. Approximately there are two large working veins, the upper vein of five to seven feet, and the lower vein from eight to ten feet. The coal seems to be solid with very little dirt or clay and burns readily with no dirt or clinkers. It is claimed to be the best lignite steam coal yet opened in the state and will be in strong demand from manufacturers and railroads as well as for domestic purposes.

The importance of this new field to Denver cannot be overestimated. The old lignite field is controlled practically by one railroad, the Colorado & Southern. With the backing of this line the trust companies have practically secured possession of the whole field and is limiting production. With the Union Pacific field open, there will be competition reestablished, and as the coal from the new field is as good or even better than the coal from the old district, the danger of a coal famine in Denver is decreased just that much. With the demand as it is now, however, there seems to be little chance of any reduction in prices this winter, for not only Kansas and Nebraska, but the railroad company as well, will provide a strong demand for the new coal, and while Denver will get its share, the competition will not be strong enough to reduce prices this coming winter.

The building of the new town right at the door of Denver is also important. The mines being opened will provide employment for a large number of miners, and the three small towns promise to grow rapidly into one large one, with Frederick the probable name of the whole. At the present time the three small towns are making a vigorous competitive fight for population, but as a majority of the new mines are located almost within the town of Frederick, it seems to have the best chance and is growing rapidly. Buildings are going up as rapidly as material can be gotten in and men found to build them. It is almost like the building of a new mining camp, with the difference that this town will be composed of coal miners and merchants. The surrounding country is just being brought under irrigation and promises to be developed in an agricultural way. Steam plows are at work breaking the sod on all sides and the growing agriculture will also prove a strong factor in the growth of the new town.

Our Coal Supply

Chief Pinchot of the United States forest service, writing in the New York Outlook, states that "if the increasing rate of consumption shown by the figures of the last seventy-five years continues to prevail (and there is every reason to believe that it will grow rather than lessen), our supplies of anthracite coal will last but fifty years, and of bituminous coal but a little over one hundred years." Of course, this may be only too true of the fields already opened and producing, but what of the vast stores still untouched by the shovel of the miner? And that these, though hidden, nevertheless exist, cannot for a moment be doubted. In the state of Colorado coal is just beginning to be discovered. In Wyoming the industry is in its infancy, yet it already surpasses the other states in the production of sub-bituminous coal. In fact, all the territory of the Great West is more or less richly encrusted with deposits of the concentrated sunshine. And Alaska, that great emporium of surprises and unknown possibilities, where coal has been neglected as the merest dross beside the more alluring yellow metal, is destined to advance as the big fuel producer of the world. The coal fields of this region are reported as most extensive, mines having been sunk in a dozen different localities along the Yukon.

In view of these facts, although not questioning his authority, we cannot agree with the chief forester's remarks. Such figures cannot be set down as the inevitable forecast of a coal famine when our resources are not thoroughly ascertained. Even with the beds already uncovered and producing, our main complaint lies with the corporations and trusts which control the immense acreages, and not so much with nature.

The spirit of conservation, however, which characterizes Mr. Pinchot, and which fits him pre-eminently of all men for the position he occupies, has no doubt been the chief inspiration of his prophecy. Such a spirit not only deserves the heartiest praise, but its emulation cannot be too highly insisted upon. Wastefulness is the predominating sin of Americans. Nature has been so prodigal in her blessings with us that we lightly spurn the commodities which Europeans have learned by a stern necessity to grasp as the greatest luxuries. In this regard the words of the forester are most pertinent. "The established coal-mining practice," he says, "at the present date does not take out more than one-half of the coal, leaving the less easily mined or lower grade material to be made permanently inaccessible by the caving in of abandoned workings. The loss to the nation from this form of waste is prodigious and inexcusable."

Such habits are to be deplored and to be stamped out with the greatest energy, for the punishment of no failing is more surely visited upon nations than that of wastefulness. With a leakage like the one mentioned, no matter what our present supplies, no matter what our unsounded resources, the end will come all too soon, of that most useful product that keeps the world in warmth and motion.

Pittsburg, Pa.

October 20.—It is stated that a 160,000 acre extension of the now failing Connellsville coking coal region has just been discovered. The Connellsville Coke Company, headed by Frank M. Osbourne of Cleveland, last Friday afternoon tapped a nine-foot vein at Tower Hill, within a mile of the Greene county line.

A rush is now being made by Greene county property owners to look up title and if possible secure more territory. Among those who are now looking up their holdings are the United States Steel Corporation, which has already $220,000,000 invested in Pennsylvania coking; the Jones & Laughlin Steel Company, the Pittsburg-Buffalo Company, the Youghiogheny & Ohio Coal Company, Pittsburg & Westmoreland Coal Company, Andrews & Hitchcock Company of Youngstown, Ohio, and the Pennsylvania railroad.

A hurried search for a foothold in the new field disclosed that the Pennsylvania railroad had acquired one entire side of Green county, taking up all property bordering on the Monongahela river. This will prevent the laying of tracks along the river bottom by any other road.

The Steel Corporation has issued orders to buy heavily of the new coke lands. Chairman Gary is quoted as saying:

"We have now only 60,000 acres of coking lands in Pennsylvania, and are buying all we can at $2,000 an acre. This totals $120,000,000 in land, and our coke ovens represent perhaps $100,000,000 more."

J. V. Thompson, of Uniontown, known as the coal and coke king of the world, owning about 200,000 acres of coal land in Western Pennsylvania and Virginia, says:

"In fifteen years the Connellsville coke region as now known will have become history. The field which is producing 20,000,000 tons yearly, requiring 740,000 cars to haul, is being rapidly depleted, and there remains only 5,000 acres unworked of the old field."

Personal

Hon. Warren A. Haggott, congressman-elect, has been visiting the San Juan and other mining districts of the state lately to ascertain the wants of the miners in the way of needed legislation. Congressman Haggott is also quite heavily interested in mining properties, both in northern Colorado and the San Juan.

Myron H. Felt, a New York mining engineer and capitalist, who has important mining interests near Silverton, San Juan county, has purchased a valuable terrace in Denver and will make this city his home. He will develop his mining properties and engage extensively in mining. In addition he will invest a quarter of a million dollars in Denver property.

Senator Simon Guggenheim is touring the state in his automobile, to become acquainted with his constituents and find what their grievances are if they have any. It is good policy to learn the legislative needs of the people in the different parts of the state, especially national legislation for a more comprehensive construction of our mining laws.

Daniel Guggenheim of New York is visiting the properties of the great association in the West and Mexico. He appears to be confident and cheerful over the mining outlook.

General Frank Hall, for the past ten years mining editor of the Denver Post, has gone to Europe, accompanied by Mrs. Hall. They will spend the winter on that side of the Atlantic.

Frank B. Carpenter of Denver, Colorado, has returned from an extended professional trip into Newfoundland and Laborador.

Earl B. Wittich, a former Montana and Colorado operator, has returned to Denver from an extensive exploration trip in western Sonora.

E. L. White of Boston, president of the Bingham Consolidated Mining Company, is making his annual inspection of the company's mines and smelter in Utah.

Lee Woods has been appointed manager of the Green Mountain Mining & Milling Company at Silverton, Colorado, C. J. Garvin having resigned.

Glenville A. Collins, M. E., of Seattle, Washington, has returned from an examination of mining properties on Queen Charlotte Island, southeastern Alaska.

J. Ciceron Castillo, formerly of Mexico City, has been engaged by the government of Colombia, S. A., to exploit the platinum deposits of that country.

Udo Hesse, M. E., of Spokane, Washington, has completed examinations of mining properties in Alaska, and will return there later to examine a number of coal properties for Washington clients.

Robert D. Luce succeeds H. R. Van Wegenen as superintendent of the Castle Dome mines in Yuma county, Arizona.

J. M. Thomas has succeeded G. G. Griswold as superintendent of the Ohio-Colorado Smelting Company's plant at Salida, Colorado.

Robert B. Stanton, M. E., has returned to his offices in New York, after spending the past six months in making examinations and tests of placer mines in Siskiyou county, California, and investigations at Tonopah, Nevada.

T. N. Stanton has resigned as manager of the Phelps-Dodge interests at Nacczari, Sonora, Mexico, and has assumed the management of the properties of the Casodos Mining Company in the Hostotipaquillo district, Jalisco, Mexico.

George M. Chalmers, formerly with the Rapid Economy Stamp Mill Company, San Francisco, has recently accepted the position of superintendent for the New Century Mill & Reduction Company., Inc., of Los Angeles, California.

George Westinghouse of the Westinghouse interests, Pittsburg, has made a gift to the College of Engineering of the George Washington University, of a complete electrical plant, consisting of twelve dynamos, an equal number of motors and other appliances.

Thomas R. Jones, who had charge of the Warrior Run colliery of the Lehigh Valley Coal Company for the past seven years, has been promoted and will have charge of the Coxe collieries of the same company. He will make his future headquarters in Hazleton, Pennsylvania.

Thomas T. Read, who has been professor of mining and metallurgy in Colorado College, Colorado Springs, Colorado, and recently accepted a similar professorship in the Pei-Yang University, at Tientsin, China, sails from San Francisco October 18th, to enter upon the duties of his new position.

Walter Blake of Reading has been appointed chemist to the Philadelphia & Reading Coal Company, and will have headquarters in Pottsville, Pennsylvania, where the company has equipped a fine chemical laboratory. Mr. Blake will have charge of the analysis of oils, mine water, experiments on iron, etc. He will also have charge of the treating of mine timber.

"Fitz-Mac," the noted newspaper writer, is again back in Denver, after an absence of more than a year in Nevada, Idaho, Washington, Oregon, California and other states and territories of the Northwest and Southwest. Fitz-Mac is a Bohemian in the true sense of the word and one of the best mining writers in the West.

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FOREIGN COPPER SITUATION.

Henry R. Merton & Company, Ltd., of London, in their letter of September 21st, say: "It is stated that the leading European producers have at last been able to dispose of their accumulated stock of copper, though the prices realized are said to be fairly cheap. Sulphate of copper has been in very active request and a large business is reported. Manufactured copper also found better buyers, India being ready to absorb moderate quantities of squares and yellow metal. Chinese purchases of fine copper have been effected in fair lots, and there is still a good inquiry.

"The American situation is rather puzzling. While prices over here advanced, quotations from New York came lower from day to day and finally stand at 15 to 15.50 cents. Thus it would seem that the leading producers have not been able to market any quantities of importance with their home manufacturers, notwithstanding all their concessions made to them up to now, and even the announcement of the forthcoming drastic reduction in the output of some Montana mines, has so far failed to encourage purchases."

THE STOCK AND METAL MARKETS

Colorado Springs

October 24.—The exchange opened with unusual inactivity. On Tuesday quite a little business was transacted and trading was fairly brisk. Today El Paso and Gold Sovereign sold as did some other stocks. Following are the quotations:

Mines.

Stock.	Bid.
Acacia	07
Black B	01
C. C. Con.	03¾
C. K. & N.	05
Dante	05½
Dr. Jack Pot	06⅛
Elkton	48½
El Paso	36½
Fanny Rawlins	06½
Findley	41
Gold Dollar	06½
Gold Sovereign	03⅞
Index	02
Isabella	25¼
Jack Pot	03½
Last Dollar	02
Mary Cashen	....
Mary McKinney	32
Old Gold	03½
Mollie Gibson	....
Moon A.	....
Pharmamcist	03
Portland	1.00
Prince A.	....
Vindicator	75
Work	15½

Unlisted.

Stock.	Bid.
Golden Cycle	40
Jerry Johnson	05½
U. G. M.	04¾

Prospects.

Stock.	Bid.
Agnes	....
American Con.	007
Banner	01
Bob Lee	0085
Blue B.	....
Buckhorn	0075
C. C. & M.	....
Coriolanus	....
Creede	....
Des Moines	....
Gold Bond	01¼
Gould	....
Hart	....
Ida May	02
Jolly Jane	....
Keystone	01
Little Bessie	....
Little Nell	01
Little Puck	01¼
Mary Nevin	02
Merrimac	....
Mount Beauty	06
New Haven	006
Pilgrim	01
Princess	....
Raven	01
Republic	008
Requa S.	....
Robt. B.	....
Rose Maud	02
Rose Nicol	01
St. Thomas	01⅛
Teutonic	01

Miscellaneous.

Stock.	Bid.
Anchor	002
Aola	....
Blanche	003
Cable	005
Colorado G. C.	....
Easter Bell	002
Fauntleroy	....
Favorite	....
Flower of West	007
Forepaugh	....
Golden Age	....
Goldfield	....
Gold Hill	002
Goldstone	....
Grace.	002
Greater G. B.	....
Hayden	....
Hummer	0045
Key West	001
Kimberly	....
Kitty	002
Lucrative	....
Marion	....
Matoa	005
Mariposa	....
Marquette	002
Missouri	006
Montreal	005
National	0075
Nellie V.	003
O. K.	0055
Olive Branch	....
Progress	003
Pinnacle	....
Pointer	....
Pythias	....
Red Spruce	002
Tenderfoot	0035
Texas Girl	005
Uncle Sam	002
Volcano	....
Wide Awake	001

New York

October 24.—A remarkable decline is noticeable in all stocks pertaining in any way to mining, or the uses in which the product of the mines are put to. Last week we quoted General Electric at 111½, while this week we quote it at 96½. General Electric, however, is strong, and will not in any way follow the Westinghouse people, who went into a receiver's hands, the stocks selling around 42, at one time 118 in 1902, and since that time has fluctuated, but never reaching that point since. In May Westinghouse was 80, steadily declining on account of the copper market. The failure of the Westinghouse people will have a bad effect on trade, but it is expected that the concern will be again in the running.

American Smelting in the common dropped several points from our last week's quotations, but so far is holding its own. This stock in January was 155, dropping steadily each month until the present standing was reached.

Colorado Fuel & Iron is holding its own, very little fluctuation being noticeable, although in July 33¾ was asked.

Augustus F. Heinze is down and out so far as the street is concerned. He has been severely censured for his methods, and the looseness with which he did business, and loaned money on worthless securities. However, Heinze holds that his financial enemies are the cause of his downfall and that he will yet beat them. He says he can produce copper and make money at eight cents, but these tactics will only cause the public to withhold its money from investments in which copper is used.

The closing of the Knickerbocker Trust Company and three other smaller banks in New York city depressed affairs some, but the Secretary of the Treasury, Mr. Cortelyou, reassured the public by the depositing of $25,000,000 of the government's money in New York city banks. Besides this men of large financial scope have rushed to the rescue, and already the effect of this help is being noted.

Following are the quotations:

	Close.
Amalgamated Copper	45½
American Smelting	68
American Smelting, pfd.	84¾
Colorado Fuel & Iron	15
Anaconda Copper	27½
Republic Steel	13½
National Lead	37
National Lead, pfd.	80
U. S. Steel	22½
U. S. Steel, pfd.	82½
General Electric	96½
Utah Copper	14⅝

***Curb Quotations.**

Stock.	Bid.
Arizona Commercial	8¼
Ahmeek	40
Black Mountain	4
Cumberland Ely	4⅛

Davis-Daly	4
Ely Cons. Copper	½
East Butte	4½
Furnace Creek	¼
Giroux	3
Greene Cananea Copper	5⅝
Greene Gold-Silver	⅝
Globe Cons. Copper	3½
Hancock	4
King Edward	1
Keweenaw	4
Mitchell	½
Nevada Utah	2¼
Nevada Cons.	6½
Nipissing	5⅞
Tintic	3½
Utah Apex	2¼
Ely Giroux	¼
Newhouse	6
Dom. Cop.	1¾
Mont. Sho.	4
B. & L.	⅜

*Otis & Hough..

Boston

October 24.—Notwithstanding the low price at which the shares of the Shannon Copper Company are selling, in common with the balance of the copper list, conditions at the mine were never better.

The new furnace has been installed, and although a maximum production is not being forced, the smelter is outputting at the rate of 1,500,000 pounds per month.

The management believes that for some time to come all excessive construction expenditures have been completed, and that from now out the property will show an ability to mine its copper and land the same in New York at an outside cost of 11¼ cents per pound.

In connection with improvements in the operating department, there has been a marked betterment recently in the copper contents of the ore. The concertrating ores have recently improved from an average of 2.5 per cent. to 3.2 per cent. The smelting ores average about four per cent.

The company's finances are also in good shape. During the past year, after $450,000 was disbursed in dividends, $265,000 were added to working capital.

President Amster says: "The Shannon mine is looking better than ever before in its history, and our plant is in better condition than ever before to realize the best working results. Our manager writes us that he can produce copper at not to exceed 10 cents per pound.

"At the present time our cost of mining, including development work, will not average above $2.50 per ton, and it has been as low as $2.20 per ton. Our concentrating costs are now down to 87 cents per ton, and I figure that our total costs, including charges of every character, will not exceed $6.50 per ton.

"This is a very creditable showing, and I am of the opinion that of all the copper mines in the country, Shannon's cost per pound is today lower than the average.

"In addition to other improvements, Shannon is making today a larger saving of copper from its concentrates than ever before, or about 77 per cent.

"We have today over 4,000 shareholders. It is to be regretted that the splendid condition of the mine, its plant and its finances, should develop at a time of such nysterical conditions in the general stock and metal markets."

*Following are the quotations:

Stock.	Bid.
Adventure	....
Arcadian	2¾
Allouez	19
Atlantic	7½
Bingham	5¼
Boston Con.	10
Balaklala	3
Butte Coalition	11⅛
Calumet & Hecla	540
Calumet & Arizona	90¾
Centennial	16
Copper Range	45¼
Daly-West	9½
Franklin	6⅛
Granby	60
Isle Royale	12¾
La Salle	8½
Massachusetts	2½
Michigan	7
Mohawk	37½
North Butte	31
Old Dominion	18¾
Osceola	....
Parrot	8½
Quincy	70
Shannon	7⅞
Tamarack	50
Trinity	11
United Copper	7
U. S. Smelting	25½
U. S. Smelting, pfd.	28
Utah Con.	27¼
Victoria	3⅝
Winona	2¾
Wyandot	50
Wolverine	93

*Otis & Hough.

Nevada

San Francisco, Cal., October 24.—Following were the closing quotations on mining stocks today:

Comstock.

Stock.	Bid.
Ophir	1.00
Mexican	51
Gould & Curry	15
Cons. Virginia	50
Savage	43
Hale & Norcross	57
Yellow Jacket	1.50
Belcher	26
Confidence	....
Sierra Nevada	46
Exchequer	35
Union	25

Tonopah.

Stock.	Bid.
Tonopah of Nevada	7.37½
Montana Tonopah	1.42
Tonopah Extension	1.10
MacNamara	19
Midway	45
Tonopah Belmont	78
Tonopah North Star	09
Ohio Tonopah	02
West End Cons.	31
Rescue	04
Tonopah & California	05
Golden Anchor	04
Jim Butler	30
Cash Boy	03
Home	....
Boston Tonopah	....
Montana Midway Ext.	02
Golden Crown	03

Goldfield.

Stock.	Bid.
Sandstorm	14
Columbia Mountain	16
Jumbo Extension	52
Pennsylvania	....
Kendall	08
Booth	15
Blue Bull	17
Adams	06
Silver Pick	22
Nevada Boy	03
Black Butte	03
Blue Bell	06
Dixie	03
Goldfield Columbia	....
Hibernia	02
St. Ives	30
Conqueror	04
Black Hawk	02
Lone Star	10
Goldfield Wonder	....
Potlatch	....
Oro	07
Kendall Extension	....
Sandstorm Extension	....
Mayne	02
Atlanta	21
Great Bend	....
Simmerone	....
Empire	04
Red Top Extension	14
Florence	2.27½
Diamondfield B. B. Cons.	13
Goldfield Daisy	48
Laguna	85
Combination Fraction	83
Great Bend Extension	03
Great Bend Annex	02
Milltown	....

Black Butte Bonanza	02
Kewanos	20
Esmeralda	03
Portland	06
Crackerjack	05
Frances Mohawk	50
Red Hills	21
Mohawk Extension	05
Lou Dillon	04
Grandma	07
Silver Pick Extension	03
Yellow Rose	03
Columbia Mountain Ext.	....
Goldfield Cons.	4.50
Diamondfield Triangle	06
Coming Nation	04

Bullfrog.

Stock.	Bid.
Original	03
Bullfrog Mining	03
Montana Bullfrog	01
National Bank	08
Lige Harris	01
Amethyst	08
Gold Bar	36
Steinway	....
Denver Bullfrog Annex	....
Bonnie Clare	....
Mayflower Cons.	14
Golden Sceptre	04
Montgomery Mountain	04
Bullfrog Diamondfield	....
Homestake Cons.	52
Yankee Girl	....
Nugget	....
Tramp Cons.	16
Victor	02

Manhattan.

Stock.	Bid.
Manhattan Cons.	....
Manhattan M. Co.	04
Gold Wedge	04
Seyler-Humphrey	02
Dexter	08
Little Joe	01
Crescent	02
Combination	02
Granny	18
Mustang	....
Little Grey	....
Cowboy	....
Original Manhattan	....
Broncho	04
Jumping Jack	05
Pinenut	04
Buffalo	....
Stray Dog	09
Yellow Horse	02
Indian Camp	....
Standard	....

Other Districts.

Stock.	Bid.
Fairview Silver King	....
Fairview Eagle	65
Nevada Hills	....
Pittsburg Silver Peak	90
North Star Wonder	....
Eagle's Nest	20
Alice of Wonder	....

Metals

St. Louis, October 24.—Lead dull, $4.50. Spelter dull, $5.30.

New York, October 24.—Lead quiet, $4.55@4.75.

Lake copper steady, $12.00@12.25.

Silver, 61⅝c.

Corporation Affairs and Finances

U. S. Deposits in Banks.

Washington.—As represented by bonds deposited to secure public moneys, the increase in government funds placed in National banks since August 26th, foots up $27,000,000. These figures are two days behind actual results, which are nearly to $30,000,000.

Consolidated National Bank.

At a meeting of the directors of the Consolidated National Bank W. O. Allison was elected president; T. J. Lewis, vice president and cashier. The other officers remained unchanged. The vacancies caused by the resignation of E. R. and O. F. Thomas as directors were not filled.

Adventure Copper Assessment.

Adventure Consolidated Copper Company has called an assessment of $1 per share, payable November 26th. Transfer books close November 16th, and reopen November 27th. No stock can be transferred after the closing of the books until the assessment is paid.

Silver Sent to the Interior.

Washington.—A movement of silver to interior points has been active this week, the treasury having sent out 1,295,374 standard silver dollars, against 978,050 for the corresponding week of 1906, and $815,364 in subsidiary silver coin, against $926,485 in the like week of last year.

United States Treasury.

Fiscal year 1907-8:	Oct. 21.	This Month.
Receipts	$2,728,500	$40,551,913
Expenditures	2,610,000	39,590,000
Surplus	$ 118,500	$ 961,913
Fiscal year 1906-7:		
Receipts	$1,591,718	$37,550,727
Expenditures	1,980,000	37,320,000
Deficit	$ 388,282	*$ 230,727

*Surplus.

	Oct. 21, '07	Sept. 21, '07
Available cash bal.	$236,172,959	$239,100,694
Of which in banks	177,646,025	166,441,682

National bank notes received for current redemption: This day, $871,080; this month, $13,546,455; national bank notes awaiting redemption, $16,701,249; 5 per cent. redemption fund, $21,556,510.

Metal Exports of Mexico

Acording to the statements of the Secretaria de Estado y del Despacho de Hacienda y Credita Publico, the exports of ores, metals, etc., from Mexico for the fiscal year ending with June were as below, in U. S. currency, the value of the peso being taken as 49.8 cents.

The gold and silver exports were:

Gold.	1906.	1907.
Mexican coin	$ 119	$ 14,935
Foreign coin	2,408	5,015
Bullion	13,805,212	9,415,014
Other forms	1,976,757	2,454,148
Total gold	$15,784,496	$11,889,112
Silver.	1906.	1907.
Mexican coin	$24,736,170	$12,211,917
Foreign coin	61,480	80,591
Bullion	32,889,464	31,469,241
Other forms	4,762,127	5,969,422
Total silver	$62,449,241	$49,731,171
Grand total	$78,233,241	$61,620,171

The decrease in gold exports for the last fiscal year is $3,895,384, and in silver $12,718,070; making the total decrease $16,613,454.

Miscellaneous exports for the same period were:

	1906.	1907.
Antimony	$ 517,462	$ 710,856
Copper	14,270,637	13,953,309
Zinc	167,445	1,001,183
Lead	2,474,967	1,815,059

Apparently there has been a marked falling off in the exports of copper and lead from the United States; but zinc shows a substantial increase.

FLORIDA PHOSPHATE INDUSTRY.

This state continues to be the largest producer of phosphate rock in the United States. The product marketed in 1906 was 1,301,505 long tons, valued at $5,585,578, which compares with 1,194,106 tons, $4,251,845, in 1905. The actual output in 1906, as nearly as can be estimated, was 1,232,269 tons. Of the quantity marketed last year, 587,598 tons, valued at $3,4440,276, was hard rock; 675,444 tons, $2,029,202, land pebble, and 41,463 tons, $116,100, river pebble.

COAL FOR THE NAVY.

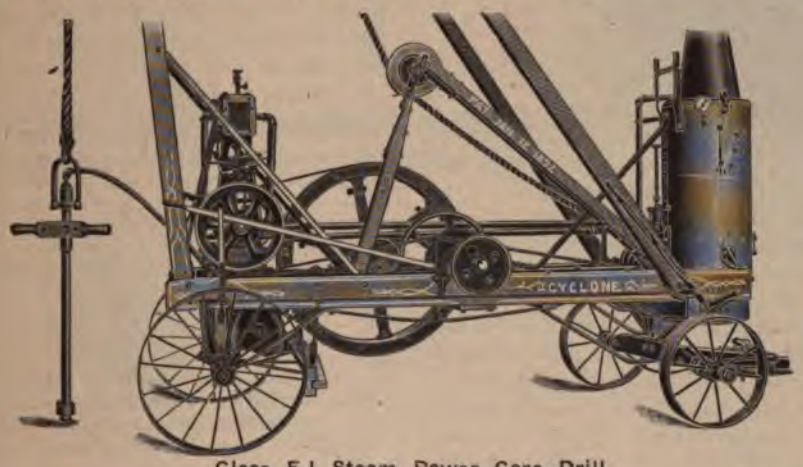
According to the estimates made by the equipment bureau of the Navy department, 253,000 tons of coal, exclusive of that to be shipped in government colliers, will be required to get the Atlantic battleship fleet to the Pacific coast and properly coal it at Mare island. Of this aggregate, 133,000 tons are semi-bituminous and the remainder Welsh coal. The former is to be shipped from Atlantic ports of the United States in vessels either of American or foreign registry. The specifications may be had upon application to the bureau of equipment, Navy department, Washington, D. C.

MACHINERY AND EQUIPMENT

Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.

A NEW TYPE OF CORE DRILL.

Owing to the demand for a core drill capable of removing accurately cores from all strata from which it is possible to obtain a core and without the use of diamonds, the Cyclone Drill Company, of Orrville, Ohio, is putting out a line of Diamondite drills containing the tried-out devices which have been found the most practicable on the various core-drilling machines and also many new features. The accompanying illustration shows one size with the engine hoist and rotator complete These drills are also built with boiler on same trucks, thus making a plant which is easly moved from one hole to another without disconnecting any part of the machinery.



Class E-I Steam Power Core Drill

The machines are operated by steam, gasoline or electric power; the hoists are of the single-drum friction types operated by a single lever working on a double screw capable of transmitting the entire pull of the engine without slipping. A powerful band brake admits of holding and controlling the tools at any desired point; the hoist is driven direct from the engine shaft with sprocket chain to prevent any slippage when raising or lowering tools. The hoist is operated entirely separate from the rotator. The rotator is provided with cut gears, phosphor bronze bushed and mounted on substantial frame; it is controlled with a multiband clutch on the driving shaft to admit of its being stopped and started instantly by the operator. The heavy steel safts which carry the rotator are provided with rack and pinion to allow it to be slid back on its supports, entirely out of the way, without removing the slotted drill rod. This saves much time when putting in and taking out drill rods. The rotator is mounted on two slide supports which permit the use of ten-foot slotted drill spindles, all of which operate on ball bearings. The triangle formed by the guides and spindle makes a rigid construction and eliminates the vibration on the spindles, which is so detrimental in securing good cores, and as all the standard core barrels are ten feet long the entire run can be made without changing or stopping the machine. Cores can be made with the diamondite process at a fraction of the cost of other methods. "Cores" is the title of an eighty-page catalog illustrating and describing the complete line of core drills and combination outfits.

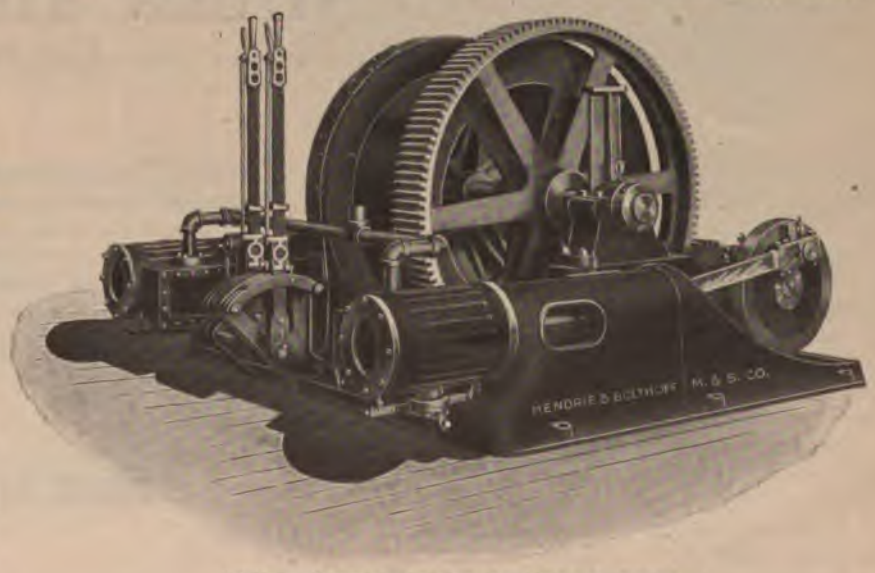
In Denver, S. G. Shaw & Company are agents for this drill.

THE HOIST QUESTION.

From the heavy machinery house of the Hendrie & Bolthoff Mfg. & Supply Company, Denver, we have just received a very beautifully illustrated catalogue entitled "The Hoist Question." It is handsomely bound and printed on eighty-pound enameled paper and the cuts could not be surpassed anywhere. The illustrations number about 100 and represent the famous electric noist and contingent machinery handled by the firm. The booklet contains about seventy pages and is a beautiful exhibition of the printer's art.

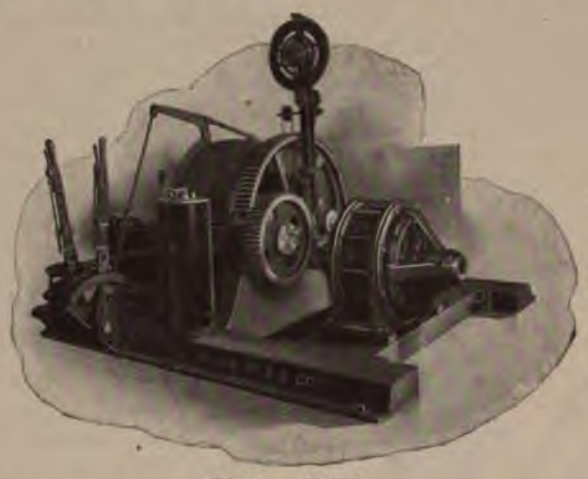
Speaking of the Vulcan Geared Hoist, known the world over, extreme care has been exercised in designing them, and they are made so that no part may fail even under the most severe tension. All wearing parts are made large and easily adjustable. The drum runs loose on the shaft, turning on brass bushings. The gears are machine cut, and all finished parts are polished. Either brake or clutch will easily hold any load that the engines will lift. The engines are very economical in steam consumption, durable and well finished.

Hoisting by means of electric power



Vulcan Geared Hoist with Tangye Frame.

is becoming popular throughout the mining world. For many years it was thought too risky, especially for sinking, but the miners have forgotten their fears now that the hoists are as substantial as steam hoists, and the current furnished by large central plants is more regular than coal supply. Where one can buy current for any reasonable price, he can not afford to install a steam plant. Hoisting service is so intermittent that only a small amount of power is used.



Electric Hoist.

The Hendrie & Bolthoff company carries in stock about all sizes of electric hoist frames up to and including No. 6. With its large stock of Induction Motors the company can usually make delivery upon any complete hoist within three or four days of date of order. This applies to hoists equipped with 440 volt, 60 cycle, 3 phase induction motors only. More time is required for direct current motors.

To get a clearer idea of these hoists, motors and their contingents, miners should send to the company for one of these descriptive catalogues. They tell the story without any circumlocution. This heavy firm is up to date in all the departments included in the field of mining machinery.

NEW CYANIDE PROCESS.

We have received Bulletin No. 2 of the W. Townsend Smith patent improved cyanide process including the apparatus. The process is owned, licensed and manufactured by the International Metallurgical Company of El Paso, Texas. The firm claims a great improvement in the cyanide treatment of ores for the extraction of their values. By this process it is claimed that three times more ore can be handled than by any other process and in the meantime make a much closer saving.

If you are building a new plant, you only need one third or one fourth as many tanks to handle the tonnage that would be necessary by any other process, whereby you make a large saving in the initial cost of the plant, in addition to the saving of the mechanical apparatus, such as pumps, shafting, belting, etc., to say nothing of lubricants, attention and depreciation. The waste water and spent solutions can also be returned to their original tanks by the use of steam syphons.

It has been contended and proved by many cyanide experts that a warm or hot solution would dissolve the precious metals much more rapidly and thoroughly than when cold. It is also a fact well known to chemists that any hot solution will dissolve its solvents much more rapidly and thoroughly than when cold. It is also known that mud or slimes suspended in a boiling hot solution will settle in from one-third to one quarter the time that they would were the solution cold. It can therefore be seen that if the cyanide solution can be heated by a cheap method that the agitation and settling would both be quickened materially. Therefore the basis of the Patent Improved Cyanide Process is that it is a hot process and the many advantages claimed for it are obtained through the use of heat.

The basis of the patent is in the use of superheated steam, in conjunction with steam syphons, to obtain the agitation and at the same time heat the solutions and slimes. The syphons are used in lieu of mechanical stirers or centrifugal pumps, and obtain the same ends in a more reliable and efficient manner. On most cyanide plants, one pump is used to operate one or more tanks. We have seen some of the most up-to-date plants in the United States and Mexico and have never known of more than one pump being used to operate a single tank, but by using steam syphons, four of them can be used on a single tank, thereby increasing and shortening the time of agitation in the same manner as four men working equally hard can perform a given task in one fourth the time that one man could. By the use of syphons, the centrifugal pumps and all mechanical apparautus connected therewith are eliminated. The steam syphons are screwed on the delivery pipes from the bottom of the tank, in the same position that a pump would occupy, and delivery pipes extend from the top of the syphons to the top of the tank and with proper elbows or bends will deliver the solutions and slimes therefrom into the tank exactly the same as with a pump.

Cyanide experts look upon this invention as a great improvement over any other system.

For illustrated catalogue address W. Townsend Smith, Box 1141, El Paso, Texas.

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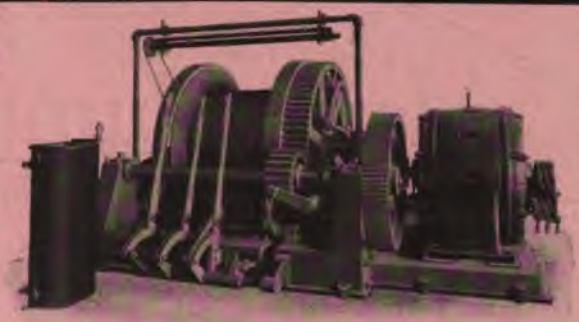

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The Great Demand for Labor

Labor is not keeping pace with the demand. The leaders of the great business enterprises of this country claim that the United States is short of labor in all branches, common and skilled labor, to the extent of at least 1,000,000 men. The country is being developed so rapidly, including Alaska, our island possessions, the new mining territory of the West, Mexico and throughout the North American continent, that it is taxing the labor market beyond its capacity. All departments of industry in this country are expanding with marvelous rapidity. The great Panama canal enterprise, the vast irrigation system of the West, railway extensions, coal and metalliferous mining, agriculture, manufacturing, merchandising, building improvements, the electric systems, and in fact all their coordinate branches are expanding, multiplying and reaching out into every nook and corner of this continent, increasing the demand for labor, capital, enterprise, and taxing genius in the development of the vast resources that cover the face of the earth like a mantle.

About all of the Western railroads are short of competent men. A prominent railway authority of this country stated a few days ago that the railroads in operation, including those under construction, could profitably employ 200,000 more competent men were they to be had. About all the coal and metalliferous mining districts of the West are short of men. Many of the large manufacturing establishments of this country, especially the iron and steel departments, railway machine shops and others, are shot of skilled labor. There is no excuse for an able-bodied idler in this country. Wages for manual labor are higher than ever before in the history of the world.

Representatives of the Harriman lines in the West have been searching the country for more men to work west of Salt Lake and the Inter-California lines. These people and their families are being transported to their destinations free of charge. There is a shortage of labor and the railroads are going into one another's territory.

The mountain railroads in Colorado are giving their men such good wages that it is difficult to induce them to leave, but a number of the firemen and engineers engaged on the prairie lines are glad to accept service farther west, as their condition will be bettered.

The Colorado & Southern railway handled 2,700 more loaded cars in September than during the same month in 1906. This indicates how business increases in Colorado.

All other Colorado companies report similar increases in business and are having difficulty in supplying all the cars demanded by the various industries.

And the railroads all over the United States are short on capacity. They are unable to supply the demand. The additional expenditure of two thousand millions of dollars would hardly bring the railway systems of the United States up to the legitimate requirements of the public. The tide has fairly set in, and a Wall street flurry or a San Francisco earthquake hardly creates a ripple in the business world.

The Approaching Mining Congress

Great interest is being taken in the tenth annual session of the American Mining Congress to be held in Joplin, Missouri, the 11th to 16th inst., inclusive. Prominent mining men from all parts of the world will be in attendance.

A well known Joplin miner says the people of his town fully appreciate the honor of entertaining the 700 or 800 distinguished delegates that will attend. They also realize that their guests will find there a mining camp unique in the history of mining.

No other camp plays so important a part in the world's production of zinc—one-fourth of the supply being produced there. The observers will find much to interest them in both underground and top development.

There will be mines at the door for demonstration, will be discussed every phase of mining of vital interest, by eminent mining men, whose years of experiece, as well as practical work, give their utterances weight no mere theory can refute.

The Joplin district has over 600 mines, 500 miles of macadam roads, fifty miles of interurban electric lines and an ideal climate. New ore bodies

are being opened as development progresses and many of these deposits extend from grassroots to a depth of 1,000 feet, the present limit of their deepest workings. The Joplin zinc and lead deposits appear to be unlimited.

Colorado's Great Prosperity

The break-up in Wall Street created very little excitement in Denver, or anywhere else in the state.

Preliminary steps were taken by the Colorado banks to insure their safety and avoid a run or calamity of any kind. Business has been going on just about the same as usual only a little more so. Colorado is on a sound financial basis and it will take more than an ordinary Wall Street shaking up to jar this state much or any other Western state. The Wall Street flurry was a good thing. It taught a few people out there what they should have known before. There is such a thing as conservative banking. It is time the plungers were relegated to the rear. These financial disturbances will teach bankers and other people caution, consevratism and safer business methods all down the line.

The country was never before blessed with such bountiful productions of all kinds. Her fruits of the soil have been surprisingly great and products of the mines never equalled. All lines of manufacturing products show marked increase with prices liberal. And these facts will apply to building material, building improvements and all other branches of industry in this country.

In nearly all departments of industry there is a shortage of labor, both skilled and unskilled. In the manufacturing branches more men are needed. There is a scarcity of men in the mining and smelting departments. Railroad construction complains of a shortage of many thousand. Officers of the Moffat road represent that they have difficulty in securing unskilled labor to work west of Gore canon, in Routt county. The action of the Harriman lines under construction in stopping operations will throw two or three thousand men into the labor market of the West, but they will be snapped up by other roads in short order.

The Railway Age reports that ten years ago the railroads of the United States were employing 826,620 persons, or 454 to each 100 miles. In June of last year they numbered 1,521,355, an increase of 649,735, or eighty-four per cent. The ratio now being 684 employes per 100 miles, an increase of 50.7 per cent. in the number of employes per mile. Per miles of track the increase has been 28 per cent; the number was 3.46 per mile of track in 1896 and 4.43 in 1906. In this period the increase in miles of line was 22.2 per cent. and in miles of track 32.6 per cent. The increase in the number of employes per unit of road is the first evidence of the rapidly increasing complexity and cost of railway operation. Labor is one of the greatest beneficiaries of railway development, both from the increased rates of wages and from the increased number of employes.

Notwithstanding this great increase in railroad extension and equipment, it is not keeping pace with the demands of the country, its growing activity and the development of its vast resources. This country stands without a parallel in the history of national growth.

Of Interest to Smelter Men

Word comes from Butte, Montana, that Oliver T. Crane, master in chancery, who heard the testimony in the noted "smoke nuisance" case, wherein it was sought to close the great Washoe smelter of the Amalgamated Copper Company. Mr. Crane announced a draft of his findings and set October 25th as the date on which he will hear objections and make final settlement. With the settlement of the findings the results will be submitted to Judge Hunt of the United States Court, who may or may not adopt them in determining the case.

In all except one of the issues the findings favor the defendant companies. The master finds that the complaint of Oliver J. Bliss of Idaho and other land owners in the Deer Lodge valley, have been damaged by the arsenic emanating from the stack of the company and that such damage will continue as long as the plant is operated. He finds the complainant, Fred J. Bliss, is entitled to special damages in the sum of $350, that amount of loss being suffered by him in the depreciation of the real value of the land.

The master, in conclusion, adopts practically the findings submitted by counsel for the defense, showing the tremendous losses and the practical paralysis of business of the state that would follow an injunction closing down the works, and states, as a finding of fact, that the farmers themselves would suffer greater loss by such suspension than they do from the fumes.

From these findings, Judge Hunt, in connection with the questions of law that are raised, will be asked to grant an injunction closing down the Washoe works. Upon the operation of the smelter depends the running of all the mines of Butte, with the exception of several Clark properties.

That decision will probably establish a precedent for all the smelters of this country. It is known that the arsenical fumes arising from smelter smokestacks are very destructive to vegetation and detrimental to health. But if the evil cannot be abated by some chemical or mechanical appliance, the smelters had better pay for the damage they do and go on. The law can no more close the smelters than it can stop mining, but if by any reasonable process the nuisance can be abated it should be done. We have seen the heavy spruce and pine timber of a whole mountain slope deadened by the arsenical and sulphuric acid fumes from one small smelter in operation eighteen months.

United States Drafts in the Latin-American Countries

Reports from Washington, according to advices which have been received at the Bureau of American Republics from representatives of South American business concerns, show that a decided increase in the valuation of the United States drafts in the Latin-American countries is taking place. These firms report that this increase is especially noted in the comparison of the valuation of the London and New York drafts.

For many years is has been the custom of the South American business houses to transact all deals and sales with drafts of London banks because of the much better valuation which they could receive when the amount was changed into the currency of the country where they were located. For this reason the London drafts became almost universal and only recently has the draft from the New York banks entered into profitable use.

In one communication which Director Barrett received from a prominent firm in Argentina notice was given of the increased valuation of New York drafts in that country. One instance was cited where a draft on a London bank for forty pounds sterling was changed into Argentine gold coin. The amount given in exchange was $199.03 Argentine gold or in other words the draft was received for 99.09 per cent. of its par value.

The firm stated in the letter that when a draft on a New York bank for $200 or comparatively forty pounds English money, was changed, the amount given in return was $227.25 Argentine gold. The draft in this case was received for 99.1 per cent. of its par value, showing that the valuation of the latter class of banks had increased so that instead of being below the percentage of the London banks, it was slightly above the amount. Director Barrett says that this is but one instance of the marked increase of the value of the New York draft and that he has received several communications which speak of the same advance in the valuation when changed into the coinage of the South American country.

Recent Improvement in Slime Treatment

By D. J. Kelly.*

The cyanide treatment of gold and silver ores has advanced, during the past fifteen years, from comparative obscurity to its present prominence; and it may be said that no other branch of hydrometallurgy has such widespread geographical distribution, or approaches it in economic importance today.

As was to have been expected, in attaining this eminent position it has undergone numerous modifications and provements; but it is interesting to note that its chemistry remains practically as it was introduced by McArthur and Forrest—its real development having advanced on mechanical lines.

In the early days it was the general opinion that poor extraction of metal values from ores was due wholly to improper chemical conditions, and numerous decoctions were used in combination with the cyanide solution to create chemical activity; but while great merit was claimed for some of these processes, none of them stood the test of time, and it was at length recognized that the real cure lay in more favorable mechanical conditions.

The mechanical deficiencies of cyanide mills have been responsible for poor extraction and recovery to a great degree; and the chemical end presenting very few difficulties in the treatment of ores not containing sufficient destructive compounds to preclude the use of cyanide.

It is, of course, necessary in many cases, to subject ores to a preliminary roast or some chemical treatment, and no disputation is made of this fact, it being assumed that the ore has been prepared for cyanide treatment in such cases.

The separation of the precious metal-bearing solution from the residues is now being accomplished in various ways which may be classified as follows:

1. Percolation of crushed ore in vats provided with filter bottoms.
2. Decantation.
3. Separation of sands and slimes with subsequent treatment of sands by percolation, and slimes by decantation, plate and frame presses, suction filters or tank pressure filters.
4. Regrinding of separated sands to obtain an all-slime product which is subsequently treated by filtration.

The practice of subjecting crushed pulp to the action of a cyanide solution in an ordinary leaching tank is rapidly growing into disfavor with progressive metallurgists. This old method should properly be condemned and give place to those which have been demonstrated to be superior. This is proven by the fact that many tailing dumps from plants using the old method are now being profitably treated by the employment of improved mechanical devices. The chief difficulties originally encountered were as follows:

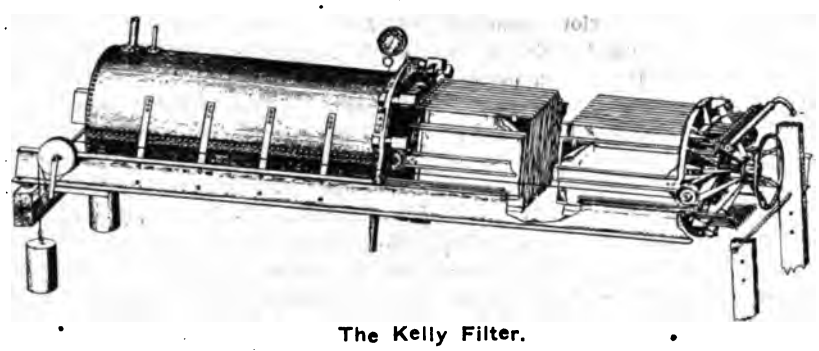
With the majority of ores, coarse grinding was almost imperative because fine grinding would produce a large percentage of slime, which was very undesirable on account of its stubborn resistance to percolation. Coarse particles proved to be objectionable because the contained gold was not subject to attack by the surrounding solution. The presence of slime in the leaching vat, in addition to lengthening considerably the time required to effect solution of gold contents, was a source of annoyance and loss owing to its stubborn retention of the dissolved values. That is, a proper washing or displacement of gold solution could not be accomplished under such conditions.

Decantation is resorted to in South Africa, but owning to the excellent results obtained by the Denny brothers, from the introduction of the west Australian methods at the Meyer & Charlton mine, we may expect to see it become as obsolete on the Rand as it has become in most other fields where cyanide extraction is employed.

A decantation plant necessitates the installation of a large number of tanks to provide for the settling out of the slime and decantation of supernatant liquor. Besides requiring a tank capacity out of all proportion to the amount of slime handled, it requires an undue quantity of water and there is always some loss in soluble gold and cyanide. Dilution of the settled pulp and further decantation reduce the gold contents, but this dilution can not be so effective as a good displacement.

The decanted solution carries a small percentage of impalpable slime in suspension which is not visible, the solution appearing quite clear, but the presence of this material is made evident during precipitation. It tends to coat the zinc shavings, thereby interfering with good precipitation and lowering the grade of cyanide product obtained. To overcome this, filter presses are used for clarifying the gold solution before going to zinc boxes. It is evident that decantation requires a considerable amount of water, which would render the method prohibitive in many localities. The best practice for economical recovery of the gold will now be considered.

It can not be said that fine granding is new in its application to cyanide metallurgy for it has been in vogue for a number of years in Australia and other localities. Tube mills have solved the problem of reducing pulp to a proper degree of fineness and various methods have been tried to treat this slime material in the separation of the solids, or tailings, from the precious metal-bearing solution. In Australia this is the standard practice, plate and frame presses being, as yet, the favorite means of treating slimes.



The Kelly Filter.

This type of filter has been in general use for metallurgical operations for a long while and is therefore pretty well known.

It consists of a number of solid cast-iron plates corrugated on both sides and machined near their outermost edges to form neat joints with companion frames. The frames are hollow and serve as slime compartments. Filter cloths are placed over each plate. The plates and frames are provided with projections at their edges which act as supports to hold them vertically. These projections rest on beams or trusses which also serve as guides. The beams are attached to heavy castings at each end of the press. By arranging the plates and frames alternately and clamping them tightly together, a se-

*A paper read before the Utah Section Western Association of Technical Chemists and Metallurgists, on June 14, 1907.

ries of hollow compartments with filters on both sides are formed. Provision is made for the introduction ot slime pulp to the interior of the compartments formed by the hollow frames and appropriate channels convey away the filtered liquids from the plates. To dump the contents the press is loosened and the operators separate the plates and frames by pulling them forward, one at a time, discharging the contents of each individual frame, until the complete series is finished.

The writer having had charge of a plant in which plate frame presses were installed, found by experience, that many defects were present which seriously interfered with the economical treatment of the slime pulp in this manner, and will enumerate some of the difficulties encountered.

It might be here stated that these presses were inferior from a standpoint of design and workmanship, and many aggravating troubles resulted from this fact alone. This will not be considered here, but the general defects of this type of machine will be briefly indicated:

Perhaps its most serious inherent defect lies in the excessive number of joints to be made tight as a preliminary to each cycle of operations. It must be borne in mind that every hydraulic joint is a source of possible leakage, and the tight clamping of the fifty to seventy flat contact joints in the ordinary plate and frame press is a very difficult mechanical operation; and, even with the enormous hydraulic power employed in the closure of modern types of this machine, leaky joints are of common occurrence in actual practice.

This leakage from defective joints, in addition to handicapping the operation, is the source of serious discrepancies in the bullion returns by reason of the unavoidable losses of gold-bearing solutions.

Direct leaching in presses is not resorted to except in cases where it becomes necessary to dewater slimes before subjecting them to the action of the cyanide solution. The best metallurgical practice, however, is to effect a solution before pressing, thus materially shortening the operation, and, at the same time giving better extraction results. This limits the function of a filter press to a simple filtration and washing, and it is assumed here that the values are dissolved before pressing is begun.

Another source of annoyance and expense is the breakage of plates, due to unequal pressure when slime channels, leading to some of the distance frames, become choked and shut off their feed. It is true that this trouble has been largely overcome by improved mechanical design and intelligent operation, but plate breakage is still an item to be reckoned in the cost of maintenance.

To obtain a complete leach, or wash, it is necessary to build slime cakes of uniform permeability or equal resistance, at all points, to the wash solution.

With most slimed material there is a decided tendency for settling out of the coarser particles when out of the influence of agitation.

This classification of slime pulp in the frames is detrimental because, owing to the sands settling in lower part of frames, the cakes, while of even thickness, are not evenly permeable, and the leaching solution, or wash water, when introduced, naturally follows the line of least resistance. Rapid filling overcomes this classification to some extent, and some slimes do not exhibit this tendency to classify, but that is because they have already been subjected to careful preliminary classification.

This type of filter, being composed of massive iron castings, is also excessively heavy per unit of capacity, and transportation charges from factory to mill constitute an undesirable proportion of the cost of installation.

As yet no efficient mechanism has been devised for the operation of taking apart and setting up the plates and frames, and in order to discharge the slime cakes the services of two men are employed, each plate and frame being handled individually.

Many small improvements have been made in the design and finish of the plate and frame press, but no radical departures have hitherto been made from the old form. The improvements have consisted mainly in arranging the slime channels in a manner to avoid cutting holes in the filter cloths, the machine work on joints has received careful attention, and a hydraulic mechanism has superseded the screw tightener.

To obviate the manual labor involved in this tedious method of discharging the load, an interesting and ingenious modification of this type of press, developed in the Black Hills by C. W. Merrill, may be noted. This consists in the disintegrating, and sluicing out, through suitable ports or channels, of the slime cakes from distance frames by high-pressure water jets, the discharge being effected without unclamping of plates and frames.

Assuming that the discharge effected by these means is reasonably complete, the consumption of water for this purpose is one which would restrict its use to localities blessed with a generous supply of this commodity, and also with ample facilities for the disposal of the disintegrated and diluted slime cakes.

However, in view of the fact that conservation of water, and consequently stacking the tailings in dry and compact form, is imperative in most instances, this development must be considered of local rather than general application.

Vacuum suction filters, of various types, have been developed and are in use at a number of mills in this country and Old Mexico.

They have done much to simplify the treatment of slime pulp.

Without going into any discussion as to the relative merits of the various styles, it will suffice to say that an inherent weakness of this type is low maximum pressure obtainable. This canont exceed atmospheric pressure in any case, and in actual practice rarely reaches twelve pounds, according to efficiency of such pump and altitude of mill. With slimes offering much resistance the time for a cycle of operation is greatly prolonged by lack of sufficient pressure for rapid filtration. To get capacity a large filter area is necessary, aften making the machine cumbersome and unwieldy.

Realizing the good features of pressure filtration and noting the mechanical deficiencies of the late and frame press, the writer has been engaged in the development of a filter which eliminates the short-comings referred to.

There is no leakage, no possible breakage of plates, the washing is almost perfect and the cakes are discharged in solid form, and with no expenditure of energy, this operation being practically automatic.

This machine, illustrated in the accompanying figure, consists of a pressure tank and a carrier supporting a series of filter diaphragms vertically disposed. Each diaphragm consists of a rectangular piece of double crimped wire cloth completely enveloped with a filter bag of cotton duck. The wire cloth prevents the sides of the bag from collapsing when pressure is applied and also provides channels for the free passage of filtered liquid. Pipes communicating with the interior of the filters are connected with outlets through the head of the press. The upper pipe extends the full length of the diaphragm and projects slightly at both ends, the front end being coupled to the upper part of the head and the rear end resting on and supported by the back part of the movable carrier. The lower front corner of each diaphragm is connected with outlets through the head by means of an appropriate fitting and all filtered solution is drawn from this point.

The filter carrier consists only of the head of the tank and a supporting

frame at the rear, connected by channel beams at each side. This carrier is mounted on four wheels, two of which are attached to the head, the other two being mounted on an axle which supports the rear end of the carrier. Tracks are arranged lengthwise inside of the tank and act as supports and guides for the rear wheels. Channel beams supporting the tank on outside serve as tracks and guides for the wheels on the head. This construction permits the free movement of the carrier into or out of the pressure tank, amounting virtually to a telescopic action. The head-locking mechanism consists of a number of radial levers, the outer ends of which engage the projecting lugs bolted to the cast-iron flange attached to the tank. The inner ends of the levers are pivoted to a moveable collar which is controlled by a central hand wheel. By turning the hand wheel in the proper direction the head can be readily clamped or unclamped. An annular groove in the flange contains a rubber gasket and an annular projecting ring on the head engages this gasket in the grooved flange forming a tight joint when press is closed. When set up the machine is inclined, being lower at the front end than at the back. This inclination serves two purposes. It provides a hopper bottom at the lower front end of the tank, a desirable feature in the circulation of slime pulp during filtration, and also supplies proper conditions for automatic opening of the press which will be referred to later. To explain the action of the press a cycle of operation will be described.

First, the head is securely clamped to the tank by means of the head-locking mechanism. Slime pulp is now rapidly introduced and an overflow pipe indicates when the tank is full. This filling can be done by gravity or by a centrifugal or plunger pump. The overflow is now closed. The slime pulp completely surrounds the filter diaphragms. The solution immediately penetrates the sides of the bags to the interior of the diaphragms, from which it passes through the head connections to the outside of the tank, whence it is conveyed to the gold solution tank. A proportionate amount of solids build up on the outside of the filter bags during this separation of solid and liquid matter. Pressure is maintained and the tank is kept filled by means of the pumps referred to. Filtration is continued until a proper thickness of cake is obtained, a point determined by the behavior of the pressure gauge and rate of outflow of filtered solution. The slime pulp supply is then cut off and compressed air admitted. A valve at the lower end of the tank is opened and the excess of pulp is run back to supply tank. The air pressure serves to hold cakes in place and assists in forcing out excess pulp. A pressure of two or three pounds is sufficient. The tank being empty, a weak solution of cyanide is pumped in at the lower end. This surrounds the slime cakes and when the tank is filled, the hydraulic pressure forces this wash solution through the cakes, removing the gold solution retained by them as moisture after filtration. This washing is uniform, because the cakes, having been built up at all points at a uniform pressure, give an equal resistance at all points. After washing sufficiently, the solution supply is closed and air again introduced to pressure tank to displace excess solution, which is returned to its supply tank. Wash water is now introduced in the same manner and the previous operation repeated, returning excess to water supply tank. Everything of a soluble nature is now removed from the residues and the press can be opened to discharge them. If it is desirable to blow the cakes with air before this to remove as much moisture as possible, this can be done by introducing high pressure air into the cylinder. To open the press the internal pressure is reduced, and the head-mechanism unclamped. The filter diaphragms have accumulated considerable weight from the deposition of slime cakes upon the external surfaces, and this supplies the energy for moving carrier down the incline. The weight of the empty filters and carrier is counterbalanced, thus requiring only sufficient extra weight on filters to overcome this balance. A brake controls the rate of travel of the carrier. The filters are allowed to emerge from the pressure tank, stops being placed to prevent travel past a certain point. The next step is to discharge the slime cakes.

This is done by admitting low-pressure steam through the several pipes comunicating with the interior of the diaphragms and connected outside to a common header. Immediately upon coming into contact with the cold inner surfaces of the filter bags the steam condenses. The warm moisture from condensation penetrates through the pores to the outside and breaks the contact between the outside of filter fabric and the inner side of slime cakes. This being done the cakes are free to fall by gravity into a suitable hopper below. In addition to discharging these residues the steam also cleans the pores of filters, putting them in excellent condition for the succeeding filtration.

The filter carrier being now relieved of its weight of slime cakes, the counterbalances bring it back into place inside the tank again. The head is clamped and the press is ready for another cycle of operations.

Having thus described the general construction and operation of this pressure filter, attention will now be called to some data obtained at the Vindicator experimental mill, at Bull Hill, in the Cripple Creek district, where one of these machines was installed.

This experimental plant was erected by the Vindicator Consolidated Gold Mining Company, at the instance of Messrs. Shipman and Grant, consulting engineers, who having had extensive experience in the West Australian field, undertook to demonstrate the application of the methods in vogue there to the treatment of similar ores in the Cripple Creek district.

The following are the dimensions of the Kelly filter installed in this mill:

The pressure tank is four feet in diameter and nine feet six inches long. The diaphragms are spaced at two and three-quarter-inch centers and there are fifteen of them in all, having a total filter area of 650 square feet. This ore was cut down to 300 square feet by removing alternate diaphragms, making a spacing of five and one-quarter inches. The filtration was so rapid that this arrangement was found preferable, a thick cake being obtained in a short period. The ore treated is a sulpho-telluride, and requires a preliminary roast. After roasting in an Edwards furnace, the pulp is slimed in grinding pans with cyanide solution and the thickened pulp agitated. After agitation the pulp is delivered to the Kelly press, where it is filtered and washed, removing all gold-bearing solution, the residues being taken to the dump. The average pulp delivered to the press was about 40 per cent. solids. The moisture in the cakes was about 22 per cent. Each press load represented two tons of dry slimes, making each square foot of filter area equal to thirteen pounds of dry slime per charge. A complete cycle under reasonably good conditions can be completed in an hour, making the approximate capacity of this size machine fifty tons per day on this material. The method of treatment as well as the character of slime pulp governs the capacity. For instance, if the formation of cakes is followed by a wash with a solution of cyanide and this by a water wash, the time required is greater than if one of these latter operations is dispensed with. No appreciable difference in tailings was apparent by omitting one or the other of these operations, one wash removing the soluble gold.

From the experience gained at this plant a reasonable estimate for the time required for each operation would be as follows: Filling pressure tank with slime pulp five minutes, filtration fifteen minutes, returning excess solution four minutes and filling with water four minutes, discharging cakes twelve minutes. It will be observed that less time is required for filling the tank with wash solutions, and this is because the accumulated slime cakes have taken up a considerable portion of the space in the tank, leaving less to fill. An opportunity was afforded for a comparison of the relative efficiency of the plate and frame press and the Kelly press, as one of the former had been in operation previous to the installation of the latter. Assays of the tailings showed a saving of 33 cents per ton in favor of the pressure tank filter. Taking into account the waste due to excessive leakage from joints of the old type, this saving would be materially increased; as leakage is not a factor to be considered in the improved type.

Other points of superiority worth mention are as follows:

The filtered solution comes quite clear from the beginning of operations and continues so during the cycle. This removed the need of a clarifying press, although one would probably be a safeguard in case of emergency, especially in the operation of a battery of presses. If a leak occurs in a filter the cock controlling same can be shut off at any time, this in no way interfering with the action of the other filters. A faulty diaphragm can quickly be replaced when the filter carrier is outside of the tank. The accessibility of all parts reduces to a minimum the possibility of any loss of time for shut-downs. The canvas bags have long life from the fact that they have only to provide a filter medium, not being used for gaskets.

A circulation of slime pulp in the pressure tank can be maintained during filtration insuring aeration and a uniform consistency of slime pulp. If proper conditions prevail for the sluicing out of tailings, a simple mixer could be placed under tailings discharge and cakes sufficiently disintegrated and thinned with water to make them flow by gravity. On the other hand residues can also be delivered to the dump in a compact form.

The pressure is positive and may be regulated at will, a safe maximum pressure being 125 pounds, which would rarely be necessary.

Comparatively speaking, a machine of this capacity is not heavy, the total weight being about six tons, whereas a plate and frame press of approximately the same daily capacity weigh about fourteen tons.

In the foregoing the writer has endeavored to indicate some of the main difficulties met with, and to describe the means adopted to overcome same.

The economic importance of the advances made in the art of slimes treatment during the past five years can scarcely be overestimated, and it is gratifying to note that the improvements effected in this country form no mean proportion of the aggregate, showing that in this, as in other branches of technical work, we are fully alive to the requirements of the situation, and not slow to recognize the conditions which constitute efficient and successful practice.

Annual Report of the Colorado & Southern Railroad

The Colorado & Southern railroad makes a highly creditable report by its president, Frank Trumbull, and Grenville M. Dodge of New York, chairman of the board of directors, for the fiscal year ending June 30, 1907. A large amount of money was expended during the year in improvements, extensions, additional equipment and other contingents. Colorado is proud of this well equipped and ably managed railway system within her borders. Of course, the Colorado & Southern extends south into New Mexico, Texas and other geographical divisions, but Colorado is the parent state of the entire system. It has opened up the great mining camps of Lake, Park, Chaffee, Gunnison, Summit, Clear Creek, Gilpin and Boulder counties, and has penetrated the rich and fertile valleys along the eastern base of the Rocky mountains from Orin Junction, Wyoming, through Colorado, a portion of New Mexico, Oklahoma, the heart of Texas to Galveston on the Gulf of Mexico, aggregating 2,110 miles, including all branches and divisions.

President Trumbull says in his report the Colorado & Southern is thoroughly identified with the business activities of Colorado, Wyoming, New Mexico, Oklahoma and Texas, bringing these great western states and territories into closer business relations and giving them direct communication by rail with Galveston, the most important shipping point on the Gulf of Mexico. The president points to the fact that the company has without exclusive privileges and without subsidies or guarantees from the state brought the Pike's peak region as near to tidewater as is Chicago, and at the same time increased the importance of Galveston, Texas, as a seaport.

With an increase in operating expenses over the previous year of $1,344,706.73, the gross earnings for the fiscal year ended June 30 amounted to $13,456,489.14, an increase of $1,803,043.45, or 15.47 per cent., leaving net earnings of $4,209,570.51, or an increase of $458,336.72 over the net of 1906. Of the total earnings 72.26 per cent., or $9,723,961.77, is attributed to the freight business, and 23.59 per cent., or $3,173,856.89 to the passenger end of the business. The balance is from express, mail and miscellaneous.

In showing the efforts put forth during the year on branch roads to serve additional territory in northern Colorado, the report says that branches aggregating 17.16 miles have been constructed by the Fort Collins Development Railway Company and 19.46 miles by the Colorado Railroad Company. In addition to this a line to serve the important territory between Denver on the one hand and Boulder and adjacent coal mining camps on the other hand, aggregating 17.75 miles, to permit the operation of forty-four miles by electricity for frequent passenger service, is under construction by the Denver & Interurban Railway Company, which it is expected will be in operation by next spring. The last named company is also constructing a passenger line in Fort Collins, to be operated by electricity, which it is expected will be in operation by December of this year. Improvements and extensions of considerable moment in Texas, on the Fort Worth & Denver Terminal railway and the Trinity & Brazos Valley railroad are also set forth.

To handle the increased business of the lines, the company until the close of the fiscal year added to its equipment 1,355 cars, with orders in the shops for 1,327 more. Of the first lot, 1,120 were freight cars, forty-seven locomotives and twenty-four passenger coaches. Of the lot under construction, 1,156 are freight cars and nineteen locomotives.

Trumbull's Report.

"Railway companies have for years in their reports led all corporations in the matter of publicity, and in an annual report like this some allusion to your company's attitude toward current economic discussions may properly be included. Much has been said of late concerning the shortcomings of corporations. It is doubtless true that they have not been infallible; but have they in that respect been in complete isolation? If one looks at the vast field served by railway corporations and the greatly diversified interests they have to satisfy and contend with, and the army of over one and one-half

million employes, which, like all armies, must have efficient leaders and thorough discipline if safety and success are to be achieved; and if one considers that the development of the country and its business growth have been so rapid that it has been impossible for other industries to keep pace with it, is it not remarkable that the railroads are meeting, as well as they are, the demands made upon them without a substantial increase in rates, particularly as the cost of everything which goes into the construction, improvement, maintenance and operation of railroads has enormously increased?

Heavy Passenger Traffic.

"The number of passengers carried was 2,801,699, at an average rate of 2.44 cents per mile—a trifle more than a two-cent postage stamp, and this partly in a section where physical operations are most difficult and where wages are probably the highest in the world. Compare this, for example, with England and Wales, with an area of 58,000 square miles (about one-half of Colorado or about one-fifth of Texas), where the number of passengers carried is more than in the whole 3,025,000 square miles of the United States. In England, with much lower wages, the regular third-class rate is a penny (two cents) per mile, and first-class passengers (only three per cent. of the total) pay over three cents. The railway mileage of Great Britain is about one-tenth of that of the United States, but it carries nearly one-half as much capitalization.

"The number of tons of freight carried by your company during the year was 7,090,901, at an average cost to the shipper of 1.05 cents per mile—2,000 pounds carried one mile for about the equivalent of a one-cent postage stamp. You distributed during the year:

For labor and material employed in productive operations, over (An in crease over previous year of more than $1,300,000.	$9.000,000
For taxes, over	335.000
For imprevements and new equipment, over	4.400.000
For new construction, over	6.000.000
Total	$20,335.000
To investors for interest, a little less than	$2,000,000
To investors for dividends	510,000

"Doubtless two-thirds or more of the payments for material and for improvements, new equipment and construction went to labor in one form or another.

"The fact that recent national legislation is being carried out practically and harmoniously by the government and the roads will doubtless result in relieving friction and afford a better understanding of the motives and work of the railroads, and the necessity, from the standpoint of public welfare (to say nothing of that of private invsetors, whose confidence must be retained) of not crippling an industry which is endeavoring to serve the interwoven needs and productive power of a population which will soon number one hundred millions of souls.

"Your 'corporation' is identified with the citizens and business interests of Colorado, Wyoming and New Mexico, and is sponsor, by use of its general credit, for important lines in Texas, which have brought closer together the people of those great sections, in which development is simply well begun. Your lines have, without exclusive privileges and without subsidies or guaranties from the state, brought the 'Pike's Peak' region as near to tidewater as Chicago is, and in doing this have at the same time assisted greatly in increasing the importance of Galveston, Texas. Surely your company occupies a place in the life of the nation, and your directors, recognizing a dual trusteeship, desire that all your patrons may prosper, that your employes may be steadily engaged and that your profits may increase so that ability to perform public functions may be continually augmented, as it ought to be, and so that if, through a rest cure or otherwise, general financial conditions in America again improve, your company's sphere of influence may seem to capital and enterprise an inviting field for further expansion.

"Statements, both financial and statistical, presented by the general auditor, exhibit fully operations for the year, and the accounts have been verified by Messrs. Doolittle, Plender, Griffiths & Co., whose certificate appears in another part of my report.

"Acknowledgment is made with pleasure to officers and employes for faithful service rendered.

"By order of the board of directors.

"FRANK TRUMBULL,
"President.

"GRENVILLE M. DODGE,
"Chairman."

U. S. Reduction and Refining

The United States Reduction & Refining Company has issued its full pamphlet report for the year ended August 1, 1907. The income account compares as follows:

	1907	1906
Gross inc.	$527,778	$701,333
Exp., tax, etc.	133,247	120,131
Net	$394,531	$581,202
Int. and pfd. divs.	395,748	404,498
Deficit	$ 1,217	*$176,704

*Surplus.

The general baiance sheet of the U. S. Reduction & Refining Company as of August 1, 1907, compares as follows:

	Assets. 1907	1906
Cost prop.	*$12,318,881	$12,168,921
Skg fund bd invest	666,000	573,000
Outside inv.	392,500	390,000
Cash	585,233	690,165
Kessler & Co.	11,858	8,841
N. Y. Tr. Co.	224	779
Stock on hand	203,954	365,555
Total	$14,178,650	$14,197,262
	Liabilities.	
Pfd stock	$ 3,945,800	$ 3,945,800
Com stock	5,918,800	5,918,800
1st mtg bds	2,650,000	2,650,000
Accts pay	20,100	40,362
Unpaid Int.	10,830	8,100
Unpaid Divs	878	741
Accrued Int.	13,250	13,250
Surplus	1,618,992	1,620,208
Total	$14,178,650	$14,197,262

*The increase over the 1906 amount represents the cost of the "new cyanide plant" at Colorado City, $149,960.

J. D. Hawkins, chairman of the executive committee, in his remarks accompanying the annual report, says in part as follows:

"The Reduction Company has not handled as much ore in the past fiscal year as before on account, in addition to the decrease in tonnage, of the competition we have had in another ore treatment mill. Your committee believed, after careful consideration, when the competitor entered the market, that the low rates of treatment offered by it could result only in failure, as have all other similar attempts, and determined to maintain the treatment rates on an equitable basis, which would give our company a fair profit per ton even if it did result in decreased tonnage for a time, as we felt that the ultimate result would be to the advantage of our company. Since the close of our last fiscal year, the competing mill has been almost completely destroyed by fire, but it is claimed that the mill will be rebuilt.

"The tonnage of ore produced in the Cripple Creek district during the past fiscal year was less than that of the preceding year. This is largely accounted for by the difficulties in deep mining that have come from the water in the mines. The drainage tunnel that will drain the mines for 740 feet below the drainage level established by the tunnel completed in August, 1904, has been started and is being driven rapidly. This will stimulate production and will add an enormous tonnage to the available ore of the Cripple Creek district.

"The plant that was erected for treating the tailing dumps at Colorado City has proven very profitable and successful, not only in treating the tailings in the dumps, but also those coming from the plant from day to day, and has resulted in a very material increase in the company's revenues. Further experimental work on an adjunct of this tailings plant is now in progress, by which we expect to add still further to our earnings, and at the time of the annual meeting in the coming January, we expect to be able to give full reports of this work."

Mining Letters from Correspondents

Mines and Mining Wishes to Secure an Actual Reputable Correspondent from the Mining Centers of the World

Denver

October 31.—The business situation of Denver, and in fact, the entire state, could hardly be on better basis. Money is plentiful; crops have been bountiful, and the mines and mills have produced much greater results than ever in the past.

Our machinery houses have largely increased their sales during the year; collections have been responsive; labor has been fully employed and well paid, and the railroads of the West show a largely increased business both in passenger and freight transportation. Building improvements are making great headway, and all other branches are keeping step in the march of progress that has so firmly set in.

In addition to the extensive public and private improvements that are going on in the city, another large smelter is to be put up immediately. The initial plant will be of 250 tons capacity, to be enlarged to 1,000 if desired.

The company has already been incorporated, with H. C. Reno, a mining engineer of Chicago, at its head. Mr. Reno is a man of well known ability and has an extensive acquaintance among mining men in this and other states. Associated with him are several wealthy men of Cleveland, Ohio, including J. C. Kernohan, a distinguished banker of that city and other wealthy men of the Buckeye state. Mr. Reno says his company has already acquired fifteen acres of land near Argo, so located as to give them ready access to the Burlington, Colorado & Southern and Denver & Northwestern railroads.

The land is, in fact, located directly between these roads, the Denver & Northwestern (Moffat) being one side of the land, and the two other roads named running on the opposite side.

The land embraces a small bluff which it is designed to use as a slag dump, the open space being large enough to prevent the necessity of disposing of slag for a number of years.

The company will install the Macdonald system of furnaces, which are said to treat sulphide ores in such a manner as to effect a great saving in coke, while extracting the largest possible percentage of metal from the ores.

It is the intention to begin construction almost immediately and it is said the company already has contracts for custom ores to the full initial capacity of the plant.

So soon as the plant is in operation at the 250 tons capacity planned for the beginning of operations, work on enlargement will begin. But the information is given that the demand for immediate treatment of ores from certain properties, with the owners of which contracts have been made, necessitate the rushing of work to complete the 250-ton plant. The time for construction of and installation of machinery in a 1,000-ton plant, aside from the impossibility of getting machinery in quick time for such a large establishment, will create too much delay to enable the smelting company to comply with the contracts already made.

The name of the company is the Modern Smelting and Refining Company. Its head offices are at Cleveland, Mr. Kernohan having charge of the preliminary conduct of its affairs.

Officials of the company have their eye on the copper ores of the district about Lusk, Wyoming, and at Grand Encampment, Wyoming, proposing to make contracts to treat ores from these regions so soon as the enlargement of the plant is completed.

At the beginning, only Colorado ores will be handled, inasmuch as the full initial capacity of the plant will be taxed by ores which will be shipped to the smelter from this state.

So far as known, no Denver or Colorado men are concerned in the company, the entire capital having been raised among associates of Mr. Reno at Chicago, and Mr. Kernohan at Cleveland.

We have advocated the building of more independent smelters for the past ten years. For the good of the mining industry it is hoped they will stay independent. The miners of Colorado and throughout the West are amply able to build and operate independent smelters for the treatment of their own ores.

H. W. Hartman, and a syndicate of Pittsburg and Denver men, who are building an electric railway line from Englewood to Roxborough park, extending through Littleton, have secured control of the Denver & Intermountain railway. The syndicate plans the expenditure of $2,000,000 for the electrization of the Denver & Intermountain, and for its extension beyond Loretto Heights and Fort Logan, so that it will make connections with the Englewood-Roxborough park line. The Denver City Tramway Company is said to be a party to the scheme.

The Intermountain Railway Company was incorporated yesterday to take over the holdings of the Denver & Intermountain. The incorporators are Daniel Chase of Willow Lakes, S. D.; Thomas B. Doan, Thomas J. Miller, Civillian H. Chase of Willow Lakes; Caldwell Yeaman and Frank W. Loveland. The capitalization is $1,000,000. Messrs. Doan and Milner are directors in the company building from Englewood to Roxborough park.

Samuel Newhouse, who was one of the principal owners of the Denver & Intermountain, is said to have a large interest in the new company, but Pittsburg men, represented by Mr. Hartman, are understood to have control.

Yuma, Arizona

October 26.—The American group of claims, six in number, in the northeastern part of the county about four miles northwest of Salome, are presenting a good showing for the work done.

E. R. Anderson and Charles Strong own five claims in this county, viz: the Constellation, Mars, Jupiter, Saturn and Zemzem. The Constellation is a gash vein in altered granite carrying gold. The ore is free milling and the vein three and one-half feet wide. The Mars is similar to the Constellation. On the Jupiter and Saturn, the ledge is a lime formation over 400 feet wide with big mineral pockets. The ore is mainly lead of very high percentage with considerable gold and silver.

Development work is going on under the direction of Mr. Anderson, an old time and reliable prospector, and very capable mining man.

The Success mine, an old and reliable property, belongs to Charles Eichelburger of Quartzite. For some considerable time it has been idle but is soon to be opened up. Considerable mystery attaches to the movements of those having charge of the property. It produces gold and copper and much ore has been shipped in the past. The mine is located twelve miles east of Quartzite and two miles south of the Guadelupe mine, an old and familiar landmark in this section.

The Valensuela property is located about ten miles northwest of Quartzite and is supposed to be on the edge of the Yuma Indian Reservation. The property produces shipping copper ore carrying substantial values in gold. This county is full of prospectors and a boom is looked for on account of

the approach of the Arizona and California railroad, a branch of the Santa Fe.

The Mutuspaugh is located about eight miles southwest from Bouse and the work done here produces an excellent showing.

The Ibex property is in the same neighborhood and most of the claims are being developed. The ore is gold.

The Harqui Hala property is active. The mill is running and they are using all the men they can obtain.

Fred Notbuch, a produce buyer and storekeeper in Palomas, has had a number of prospectors out between Palomas and Harqui Hala in the Eagle Tail mountains. These men, it is reliably reported, found an immense ledge of iron that runs in the black sand produced from $12 up in gold. Considerable excitement prevails.

Joplin, Mo.

Oct. 26.—Dr. E. R. Buckley, state geologist of the Rolla School of Mines and the moving spirit in securing the coming session of the American Mining Congress for Joplin, spent one day in the camp this week inspecting the detailed arrangements for the meeting November 11th, which he pronounced far in advance of the work of preparation for the previous sessions. The $10,000 needed for the congress is on hand; excursions to all parts of the district, to inspect the mines and machinery have been planned, together with many social entertainments, none of which will in any way conflict with the regular business of the congress. The homes of the city have been generously offered to care for the overflow from the hotels, showing a genuineness of hospitality found only in mining camps. The Auditorium, in which the meetings are to be held, seats 3,000 people; while the mineral display close by will be worthy any mining camp in the states.

One mine, the Continental Zinc Co., has generously offered to stop work for two hours each day, so that the ladies in attendance on the congress may have the pleasure of visiting the underground development. This company's hoister is equipped with a cage that is absolutely dry. It is officially announced that there will be 1,000 members, delegates and visitors in attendance.

While the output for 1906 shows 290,000 tons of ore, and that of 1873 amounted to only 1,000 tons produced in the entire district, the ground is as yet but scratched by mines, a fact evident to any one visiting the camp. Some portions of the district never prospected before have been drilled during the past summer and shown to be good ore-bearing ground. In the earlier mining, before the drill came into use, the expense of sinking a shaft was often a total loss; now the drill tells a different story, as it locates the ore, and the mine is often planned on paper ere a spade of dirt is moved.

In 1873, zinc sold for $9 per ton; and the average price for 1906 was $43.24; the highest for the year was $47.38, last January, and the lowest $40.51 in May of that year. The highest price paid for zinc in 1907 was $48.66 in February and the lowest $40.11 in September, the later price being one of the direct results of the financial depressions of the country.

The total output in pounds of lead and zinc in the various camps of the Missouri-Kansas district for 1906 is as follows:

	Zinc.	Lead.	Values.
Webb City and Cartersville	187,068,940	44,777,120	$5,931,620
Joplin	136,635,490	13,507,150	3,618,075
Galena and Empire	58,170,160	8,408,960	1,555,245
Alba and Neck City	50,279,240	709,760	1,175,000
Badger	28,374,380	86,920	642,610
Aurora	30,195,810	690,100	565,140
Granby	21,574,050	1,950,000	409,810
Spurgeon and Spring City	11,570,510	1,777,980	258,010
Duenweg	3,862,730	3,834,680	231,430
Carthage	7,455,040	123,690	180,280
Baxter Springs	6,419,130	1,404,150	178,191
Mitchell	4,567,910	677,490	130,550
Zincite	3,087,350	85,610	72,720
Stott City	2,271,430	39,270	51,890
Cave Springs	1,294,320	8,160	27,800
Central City	752,520	17,720	16,520
Wentworth	717,270	4,400	15,110
Springfield	648,730	88,000	18,270
Sarcoxie	459,110		9,300
Reeds	174,860		4,160
Morgan County	240,000	7,930	3,920
Playter	159,230	7,590	3,450
Diamond	55,660		1,220
Carl Junction	92,140		2,120
Total for 1906	556,135,710	78,206,680	$15,102,440
And as yet but 1/100 part of the ground			

San Francisco

Oct. 27.—Charles M. Schwab addressed a large assemblage of influential men here a few days ago, his subject being "San Francisco's Industrial Situation and Her Commercial Future."

The most important of his direct statements was that after looking the ground over carefully he decided to not only continue the Union Iron Works but to modernize his ship building plant here at an additional expense of $1,000,000 or more.

This announcement threw his audience into a turmoil of excitement, hand clapping and cheering followed. He said the industrial warfare condition now existing here cannot survive; that the unusual and abnormal scale of prices paid for labor imposed by the unions on capital here must fall; that the conflicts between themselves must cease and the integrity of the courts must be restored to the people of San Francisco.

The San Francisco Mint has just received orders from Washington to coin $15,000,000 worth of gold bullion as soon as possible. No gold has been coined here since August, the active force being engaged in the coining of Filipino pesos. The mint force was considerably enlarged at the time the coinage of Philippine silver was undertaken, and it is thought this force will be adequate to handle the rush order for gold twenties.

Butte, Mont.

Oct. 30.—By an overwhelming majority the Butte Miners' Union today accepted the reduction of wages from $4.00 to $3.50, as announced by the Amalgamated Copper Company the evening of the 29th of October. The contract entered into between the company and the union provides that the scale should be $3.50 when copper is below 18 cents and $4 when it is above.

All is harmonious and satisfactory. It is reported in Butte that the Mount Hood Railway and Power Company intends building from Portland, Oregon, to Salt Lake City, and there connect with the Moffat road. It is said the vast wealth of Senator Clark is behind the enterprise.

For the eight months ending with August, Southern Rhodesia produced gold, 400,604 ounces, against 361,027 ounces in 1906; silver 96,395 ounces against 67,083 ounces; lead, 486 tons, against 416 tons; copper, 53 tons in 1907; antimony ore, 64 tons in 1907; tungsten ore, 25 tons in 1907; chrome ore, 5,755 tons in 1907; coal, 69,324 tons against 73,841 tons in 1906.

Movements in Mining Camps of World

Only Authenticated Reports Will Be Admitted to These Columns

ARIZONA

Cochise County.—The Little Rincons claims are beginning to return values in gold, silver and copper.—The Larrieu brothers have let another contract for the extension of the tunnel on their property in the Huachuca mountains.—At Johnson, the attachment has been lifted from the Bonanza Belt, (Peabody) property and work will be soon resumed.—A two foot ledge of excellent ore has been encountered at the Mayflower.—A strike in the west crosscut driven from the Consolidated tunnel of the Mascot Copper Company, has been made in body of high-grade sulphide ore similar to that recently discovered in the east crosscut. Twelve feet have been driven without meeting the opposite wall.

Graham County.—During the month of September, the Arizona Copper Company produced 1,389 tons of Bessemer copper. The company expects with its smelter under normal conditions to soon overtake its former output of 1,400 tons per month.—Small gold nuggets with frequent outcroppings of ruby silver are being found in the 150-foot shaft on the Langerman claims near Morenci where a force of eighteen men has been employed.—On the 300-foot level of the Laura mine at Steeple Rock, a large body of ruby silver and silver glance has been found, running $100 and $500 to the ton.

Maricopa County.—A nine foot vein of good ore has been opened in the 300 foot shaft of the Relief Gold mine, near Glendale. A larger mill of twenty stamps or more with a new working shaft to supply it is, in the opinion of Superintendent George Hamlin, needed to exploit the property to its best advantage. More water is also necessary, which will be sought by sinking the main shaft to a greater depth.—Harry Bennett, superintendent of the Buffalo and Arizona mine, near Morristown, is preparing to install a larger milling plant on that property, the present one of only two stamps, being utterly insufficient for the growing output of the mine. To realize the required funds the company will place on the market 10,000 shares at par value, $1.00 per share. From the 100, 200 and 300 foot levels the ore has been probed and has been found not only to justify the proposed improvements, but to necessitate them in the best interests of the company.

Pima County.—It is the intention of W. S. Wilde to lease the claims in the Oro Blanco district which he sold to Los Angeles parties for $100,000 and erect a stamp mill, with a view to actively develop the property.—The Montana group of the Oro Blanco section is, under a capable management, producing good values.—The Omega mine, near Vail, with three cars of ore and 400 tons at the mine, is to suspend shipments, owing to the low metal market. The Tilley tunnel on this property, is now in 800 feet and with sixty feet more will reach lime and the looked for contact. It is the intention of C. T. Roberts, operating the mine, to install a new compressor plant.—At Silver Bell continued good ore strikes have resulted in increased activity notwithstanding the fall in copper.—The Imperial Copper Company has received the equipment for a new hoist which will be installed on a shaft near the Union.—The concentrating plant of the last named company is rapidly nearing completion.—The El Tiro concentrator will be in operation within a month.—The Paymaster, one of the best silver and lead mines in Pima county, is soon to resume active operations. Copper indications exist on the 400-foot level of the mine.

Pinal County.—A strike of excellent sulphide ore was made on the 185-foot level of the No. 2 claim of the Arizona-Sultana group at Riverside, near Kelvin. This property is destined to become one of the heavy payers of the county.

Santa Cruz County.—The tunnel of the Alto mine in the Santa Rita range is now at a depth of more than 1,400 feet connecting with No. 1 shaft at the 285 foot level of the latter and soon to connect with the No. 2 shaft, at a lesser depth. A good deposit of galina has been recently encountered but owing to the low price of lead it is mainly for the silver values that this ore is mined.—The sinking of the shaft of the Sweet mine to the 550-foot level has been placed in the hands of contractors. The ore taken from the 250-foot level is of milling grade, with values in free gold.—Shipments of satisfactory ore are being made to the El Paso smelter from the Black Cap mine.—The Mansfield company plans new milling facilities for the treatment of the ore of milling grade now being produced in large quantities.

Yavapai County.—The Sunset company of the Copper creek district has a ledge seventy-five feet in width on which it is rapidly sinking a double compartment shaft, already at a depth of fifty-two feet. A large hoist, an eight drill air compressor and a 135 horse-power boiler, have been installed on this property.—In the month of September the Arkansas & Arizona drilled through seventy-two feet reaching the 400-foot level. The little Daisy, however, went down ninety-three feet in the same month, outdistancing its rival by twenty-one feet. The A. & A. is in gravel and the Little Daisy is a soft shale formation.—Nevada mine operators have bought the Boone copper property in Cunningham pass and will immediately commence active development.—Four Prescott women, Mesdames Broaded and Hopkins and Misses Duke Dewis and Bessie Brown, panned several dollars' worth of gold nuggets from Granite creek within a half mile of the city.—A reduction plant is under consideration at the Monica mine in the Kirkland valley secton.—The Humboldt smelter is running full blast and, according to Manager T. H. Oxnam, there is no prospect of its suspension, as the finances of the Consolidated Arizona Smelting Company are in a most favorable condition.

COLORADO

Boulder County.—The U. S. Gold Corporation has pushed its seven by nine foot adit on Sugar Loaf mountain, 125 feet in nineteen days, and progress is being continued at the rate of six to eight feet a day. Ore is being turned out in ample quantities to supply the 200-ton mill planned by the company. The old Wall Street mill is being dismantled and henceforth will be used as a testing plant. With its deepest shaft the Livingston mine of this corporation, has a production record of over $400,000, and its vein of high grade ore is without a break in continuity.—A discovery of gold-bearing rock near Lyons has created some stir in that vicinity and several claims have been staked.—A strike of high grade smelting ore was recently made along the surface of the Dolph lode, situated above Wall Street, west of the Melvina mine. The old shaft will be renovated and drifting will be commenced in order to get under the ore body.—Twenty tons of ore from the Lost Bullion mines sampled at the Chamberlain and Dillingham works in Denver, $28 to the ton, mostly in gold.

—John Wright is building a road from the Forest Queen mine to the site of the new mill.—The equipment of the Atlantic-Ward Gold Mining Company is being overhauled and prepared for the coming winter's work.—The Nelson, in Spring gulch, has a seam of tungsten ore averaging twenty-five per cent. It also has a seven inch vein of gold running $100 to the ton.—Work on the Imperial tunnel is being now carried on.—Dr. Goodwin of Denver, who lately purchased the Homestake, on Puzzler hill, has installed a fine hoisting engine on his property.—Good smelting ore is being taken from the 100-foot level of the Golden Queen at the head of Spring gulch.—Manager Alex. H. Martin is supervising the overhauling of the entire hoisting plant and the installation of the 100 horse-power Buffalo locomotive boiler, in Spring gulch, for the new mill.—The Modoc plants are being actively put in shape for a record-breaking winter campaign.

Chaffee County.—A crosscut to the vein will be made on the St. Paul shaft, Turret, as soon as the depth of 260 feet is reached.—In both east and west drifts of the Gold Bug, Turret, promising sulphide ore has been encountered, which will soon develop into good shipping grades.—The breaking into an ore shoot on the 500-foot level of the west drift of the Gold Bug, samples running $110 to the ton, will be a great stimulous to deep mining in this district.—The shaft on the Manitou has been sunk and timbered eighty feet and at the depth of 100 feet crosscutting and drifting on the vein will be instituted.

Clear Creek County.—The new compressor plant of the Capital Mining and Tunnel Company, consisting of a 100-horse power boiler, a Leyner compressor with a capacity of running twenty machine drills, is now in perfect order. The mill is steadily progressing and at the present rate will be ready for the machinery in thirty days. The east and west drifts on the Aetna vein extend now for 150 feet with ore bodies in sight six to sixteen feet wide.—M. J. Riley, leasing on the Sunburst from the Red Oak Mining and Milling Company, recently sent to the mill ore that ran 250 to 300 ounces in silver.—A shipment of nineteen tons of high grade ore has been sent to the Argo smelter, Denver, from the block on the Tobin, leased by Butler, McClusky, Cook and Company. The stope is now 200 feet in length with the vein widening from twelve inches to two and one-half feet.—The mill of the Ramsdell Gold Mining and Milling Company is being rushed as fast as the contractors can supply the lumber.—In the Lorenza on Saxon mountain, a body of concentrating ore from two to four feet in width has been followed, a number of rich pockets being opened.—John Bowen and Company, with a stope on the upper Frostberg, find increasing lead and silver values the higher the vein is opened up.—Large ore reserves are in sight on the fifth or tunnel level of the Linn Consolidated mine, where a force of men is opening up the ground.—The old Everett mine on Republican mountain, leased by Byers and Company is being cleaned out and retimbered.—Butts and Company shipped three tons of silver ore from the 240-foot level of the Astor mine, where they are leasing, which returned 450 ounces to the ton. The raise has attained a height of thirty feet.—The North Star vein in East Argentine has been intersected for twenty feet without reaching the hanging wall. A four-inch streak of ore was encountered when the lode was cut, running 700 ounces in silver and thirty ounces in gold to the ton.—The adit on the St. Joe vein on Saxon mountain has been driven over 200 feet, encountering green carbonates and a number of feeders of ore.—Martin Matte has taken a lease on the fifth level of the Santiago mine in East Argentine. A body of ore 700 feet from the tunnel entrance has been met with which measures two feet in thickness and samples two ounces in gold, fifty ounces in silver and from eighteen to twenty per cent. copper. Other leases have been made on this property.—Manager McKarahan, of the Crescent Mining and Leasing Company, is employing a force of four men on a stope in the Commonwealth vein of the Wilcox tunnel, and will son be shipping from ten to twenty tons daily. Recent tests of the ore showed $50 to the ton.—Night and day shifts at the Boston mine on Democrat mountain are producing a heavy tonnage of ore averaging sixty per cent. lead and twenty ounces in silver to the ton.—A report from Idaho Springs says that a timberman working in the stope-raise from the lower level west of the Quito mine on Chicago creek, drove an ax into a mass of crystallized gold in a pure white spar intermixed with black sulphurets and yellow iron crystals with some peacock colors. The ore is said to be the richest ever found in the county.

Dolores County.—The Silver Swan on the southern end of Expectation mountain, near Rico has 150 tons of ore on the dump with values of fifteen per cent lead, thirty per cent zinc and one per cent. copper. Three tunnels have been driven on this property, 1,000, 500 and 300 feet respectively.—New hoisting machinery is to be installed on the Emma Gold Mining Company's grounds at Dunton and a force of men is engaged in building heavy crib work against the hill side.—Work on the Dunton Consolidated property is reported as progressing at a rapid rate.—The Rio Dolores tunnel at Burns is in about 1,200 feet.—The Mountain Spring tunnel and the Limestone tunnel on the Wellington grounds are being connected for ventilation purposes.—The Chicago tunnel in the Gem of Beauty property will not be operated till next spring.—In the south drift of the Ute mines, belonging to the United Rico Mines Company, a contact vein of six inches was found, which assayed $126 a ton. In Jumbo No. 3 the vein of rich ore recently encountered is proving continuous.

Gilpin County.—Four carloads of concentrates are being held at the mill of the Gilpin Independence Mining Company, owing to the shortage of cars. O. Q. Beckworth, secretary and treasurer of the company, took to Denver recently gold retorts weighing forty-two ounces, a clean up at the Daisy mill of ores from the Golden flint mine.—A Cameron No. 5 sinking pump is being installed in the Lone Star mine of the Champion Mining and Milling Company in the Phoenix district. A depth of 270 feet has been realized in the shaft at the bottom of which two feet of yellow copper-iron and fine peacock are revealed.—The Copper Jim Mining and Milling Company, operating in the Wisconsin district, has located a ten-inch shoot of yellow copper-iron and peacock.—The Mackey mine in the Elk Park section of the Pine Creek district, will resume operations, it is said, in a few days.—Work has been suspended in the Mascot shaft of the Boston-Occidental Mining Company, on Colorado hill in the Pine Creek district until a larger hoisting engine and air compressor have been installed.—A contract for 200 feet of crosscutting has been let on the Sherman and Macon Mining and Milling property on Silver creek. The main tunnel is now driven 735 feet.—The Medora Gold Mining Company with a group of claims on the north side of Perigo hill is being organized under the management of J. W. Coon of Rollinsville.—On the Annie H. mine in Elk Park a depth of 175 feet has been sunk.—A body of ore from two and a half to three feet in width, showing gray copper and lead and runnig from $100 to $500 per ton, including gold and silver values, was struck below the 200-foot east level

of the Anchor mine, belonging to the Hearne Gold and Copper Company in Willis Gulch. The ore proving continuous, the shaft will be sunk several hundred feet further.—In the cleaning out of the three upper levels of the Nemeha property on Bobtail hill in the Gregory district, some high grade gold and silver ores have been discovered with some traces of copper. H. Ehrhardt, manager of the Nemeha Gold Mining Company, which owns besides the above, the Cotton and the Cotton Extension, intends to put in an air compressor to facilitate development.—A worn out boiler has put a temporary stop to operations at the Gem mine in the Russel district, but a sixty horse-power boiler from Stroehle and Sons of Black Hawk has been ordered by Manager Goodier, upon the arrival of which work will be prosecuted more vigorously than ever. —Hugh Edwards and Company, leasing on the 555 level of the East Notaway mine in the Russel district, recently shipped a car of ore to the Argo smelter that returned 7.50 ounces in gold, 11.34 ounces silver and 6.05 per cent. in copper, or a total value of $150.81 to the ton.—A new shaft building has been erected at the Slide mine at the foot of Pewabic mountain in the Russel district, where a whim at present used for hoisting purposes, will be later substituted by a steam plant of machinery. Superintendent Mark Harris is conducting drifting work on both sides of the shaft at a depth of 100 feet where a good crevice is showing up.—A plant of machinery is being installed in the new shaft building of the Cissler mine in the Russel district and the shaft will be unwatered so that the lower levels can be sunk considerably deeper.—The Virginia mine in Chase gulch has been shut down pending the arrival of a new pump.—John Cox of Cripple Creek has taken a part of the Bates-Hunter group on which a shaft house and electric hoist will be put up.—The Ralls County mine on Quartz hill is to be operated by E. H. Teats.—A party of twenty Easterners were recently inspecting the properties of the Fifty Gold Mines Company, some being prospective investors and some stockholders. The president of the company, James F. Lewis of New York, announced that $400,000 would be raised for the purpose of putting in a desulphuring plant and electrical machinery of the most approved pattern.—An electrical equipment is to be installed on the Powers, Willis gulch, Pennsylvanians.

Freemont County.—An immense deposit of copper near Howard and just below Badger creek, goes by the name of the Copper Farm and a number of claims have been staked out, the ore tests reaching from two to twenty-eight per cent. copper with the average value at fifteen per cent. The formation is a red sandstone, bearing a close resemblance to the Michigan copper ground.

Gunnison County.—The Kentucky Mines and Milling Company has twenty-eight claims taking in eight clearly defined veins, in Box Canon, half way between Ohio City and Waunita Springs. The company has put up a $3,700 plant of the latest and most efficient design. Ore has been taken from the tunnel running $80 in gold and $44 in copper and silver. Henry Rednour, president of the company, intends to erect a modern ten-stamp concentrating and amalgamating mill. —The Santa Fe Mining and Milling Company, composed mainly of Pueblo men, has nine claims north of the Kentucky ground, on which it has uncovered large low grade surface veins of gold and copper, now being undercut by tunnels, one of which is at a depth of 150 feet.—The lease of the Dan Collins group of ten claims, together with fourteen others, is being negotiated by Michigan parties.—A 500-ton smelting plant is to be soon erected in Crested Butte by New York and Chicago capitalists.

The North Pole mine in Crystal Basin will keep a small force at work during the winter and to this end the management in taking in a stock of supplies. in the lower workings air drills will be operated. Large bodies are exposed in the upperworkings.—The present capacity of the Marble mill at Marble is to be doubled and fifty workmen from the Vermont quarries will be added to the mill's force in consequence of the several large contracts which have been let.—The machinery for the new mill on the Jim Blain mining property is on the ground, and will be rapidly installed. —With their boiler and compressor put in the Elk Mountain Mining and Milling Company operating on Maroon mountain, is planning an active winter campaign.—The Augusta company, on the completion of their tramway, will also employ a large force on the mine during the winter.—The Crested Butte Coal Company will renew shipments from its mine.

Lake County.—The mines of the Twin Lakes district, producing mainly gold and silver, the copper slump has not affected this locality and mining is carried on as vigorously as ever.—Ore running as high as sixty-two ounces of silver is being treated in the Ruby mill.—G. V. Burge has discontinued work on the Red Mountain until the coming spring.—The Eureka and Saturday night mines are being operated by R. W. Miller.—The buildings of the Ontario Mining Company are reported as nearly finished.—The contractors on the Manhattan in Willis gulch have encountered a low grade vein.—Hanifen and associates, leasing on the No. 1 shaft of the Penn, have been taking out as much as 100 tons daily of medium grade iron ore.—The lessees on the Chippewa, adjoining, have been producing silicious gold ore of fair grade.—At the Grand View, in Empire gulch, the Hurms have found good lead ore on a seventy-foot crosscut to the vein.—Three samples from a strike in the Mammoth, Leadville, returned an average value of 1085.66 ounces of silver and twenty-six per cent. lead to the ton.—Twenty tons of silver bearing ore are being shipped daily from the Little Nell property, on Carbonate hill, where the shaft is down 500 feet. The lessees of the Sunday property on Ball mountain are shipping forty tons a day of ore running eight to ten per cent. copper and ten per cent. lead.—The Greenback property in the Leadville district has passed into the hands of a Salt Lake syndicate, incorporated under the title of the Greenback Mining Company. As soon as the 350 feet of water have been pumped out of the shaft the company will be ready to make shipments. —The New Monarch mine, one of the steady producers of Lake county, has a large vein of gold ore opened at several levels, which reveals continuous richness as it is followed up.—The Rock hill consolidation has been effected, being now under the name of Dolcoath Leasing and Exploration Company.

Mesa County.—After an exceptionally fine fruit crop Grand Junction is enjoying an era of the highest prosperity. An important land deal in which Emma L. Kinsey sold a valuable tract northwest of the city for $7,800 cash, has been transacted. Coal beds crop out in many places in the foothills of the Grand valley and will be extensively developed in the near future. Some rich copper veins have been found about twelve miles southeast of Grand Junction, on which a dozen claims, more or less developed, are staked, some producing shipping ore. Since the camp, however, is situated six miles from Whitewater, the nearest railroad point, the properties have not thus far proved paying propositions.

Ouray County.—From a strike in Poughkeepsie gulch on the property of Chris Berger, south and east of the old Poughkeepsie mine, assays have been made running as high as twenty-four ounces gold and 1.83 ounces sil-

ver, the ore being taken from a pay streak four to seven inches wide in a tunnel 100 feet below the surface.—The Savage Bear Gold and Silver Mining Company, owning thirty claims in the Bear Creek district, is planning to drive a development tunnel to gain depth. The installation of a mill is contemplated for next year. The company, with a development fund of $50,000, was organized by T. J. Pierson and F. J. Hulanski.—To drive the tunnel on the Calliope ground a distance of 3,000 feet a compressor plant will be moved from the old workings to the new tunnel site.—The management of the San Pedro will open up veins four and eight for a distance of 2,000 feet, and with a satisfactory showing will install a mill during the coming year.—A larger force will be put on the Thistledown mill when the new four-drill compressor now on the ground is put in place.—The Southwestern Gold Mining Company will shortly resume work on its holdings on Cascade mountain.—The O. & N., adjoining the Chipeta, has been leased to John Donald and associates.—The shutdown on the Chipeta tunnel, stated by the compay as due to the unstable character of the money market, is deemed by miners as a bad stroke of policy, since the mine is making an excellent showing and there is sufficient money in the company's treasury to continue development for at least a year. The equipment will be sold and leases will be let.—A bond and lease has been taken on the D. Lloyd group in Senator gulch by a Mr. Kling of Sweden.

San Juan County.—Ben Ross, Frank L. Ross and Pittsburg parties have bought the St. Paul group of claims in the Red Mountain section for $25,000 and other considerations.—A rich gray copper streak giving high values in silver has been struck by the Detroit and Colorado Mining Company, in the Thunder tunnel on Sultan mountain.—New machinery is being installed in the mill of the Old Hundred Mining Company in Cunningham gulch.—The Iowa mine of the Iowa Gold Mining and Milling Company is being pumped out and retimbered. A third shift will be added to the mill as soon as the Iowa is producing, which with the Tiger will insure a carload of concentrates a day.—The Silver Lake mill is treating about 240 tons of ore daily, having turned out in September 1,450 tons of concentrates.—A force of 150 men at the mine and fifty at the mill is being employed by the Gold King company at Gladstone. The ore is being concentrated four into one.—One from the Gold Bond property in Stony Pass assayed forty-three ounces in gold and 900 ounces in silver, a value of about $1,400 to the ton.—For leaving the premises to eject a non-union blacksmith, the Mogul miners were suspended and the mine is temporarily shut down.—O. O. Larson of Antonito is organizing the Swastica Mining Company, owning the Swastica mine on Engineer mountain, from which gold and silver ore has been taken, assaying from $129 to $3,200 a ton.

Summit County.—The Square Deal Company is installing $7,000 worth of machinery, which will be ready for development work on or before the 15th of December. An electric service of 115 horse-power has been contracted for from the Central Colorado Power Company, with which, when connected with the new machinery, the Square Deal property will be actively developed. Shares are now being sold by the company.—The Queen of the West on Jacque mountain shipped two carloads of high grade ore recently to the mill and its lessees are still working on good ore.—The Uthoff tunnel, another large Kokomo producer is being driven to cut the ore shoot of the Nettie B. property.—A number of promising veins have been opened up in the Bird's Nest group in the Mayflower gulch section.—Excellent ore was struck while digging foundations for the electric towers below Kokomo on the Gertrude group, owned by Jack McHugh and associates.—The Old Union mill has been leased for a short period by the Wellington Mines Company for the purpose of determining the machinery needs of their new mill.—Work on the Summit Power Company, Montezuma, will be completed by February 1st.—The Truax mine on Mineral hill has 200 tons of ore ready for shipment.—A new fan and fixtures have arrived for the Penn Ores Company.

MEXICO

Chihuahua.—The production of the Parral camp for one week a short time ago, was 8,950 tons.—The Cherokee Goldfields, Limited of San Julian, has resumed operations with more men employed than ever before.—Large bodies of ore are reported to be on the dumps at Parral, Minas Nuevas and Santa Barbara to be treated at the new cyanide plant, now being constructed at the Minas Nuevas, which will be in running order by the first part of next year, with a capacity of 4,000 tons daily.—A Montreal company is proposing to furnish electric power to the mines of the Parral district at a cost of two cents, Mexican money, per horse power. A thirty thousand horse power plant is to be installed.—It is said that $14,000 have been subscribed by Guanacevi, and $8,000 by Parral for the new wagon road from Guanacevi to Rosari, the terminus of the Parral branch of the Mexican Central railroad.—The approximate output of the Parral camp for the month of September was 36,285 tons, of which 9,100 tons were shipped to the smelters, and 27,185 locally treated.—The Escondida Lead Mining Company has a fifty-ton concentrator just completed. About 3,000 feet of work have been done on the company's holdings in the Escondida mountains, where the shipping grade of ore runs eighteen to twenty ounces silver and twenty per cent. lead.—The La Fortuna Mining Company, with extensive holdings in the La Fortuna district of the San Joaquin mountains, about thirty-two miles southwest of Nueva Casas Grandes, has about 5,000 feet of development on the La Fortuna mine with 500,000 tons of silver ore in sight that will reach from twenty to thirty ounces per ton. General Manager E. L. Bartholmew will put in a station pump on the 500-foot level and later a 200-ton concentration plant supplemented by a cyanide mill. Several cars of fifty-ounce ore are shipped monthly to the smelters.—It is reported that the Mina Vieja at Santa Eulalia has struck a new body of ore at a depth of 1,000 feet, 500 feet long and from seventy to 100 feet wide.—The ownership of the Homestake mine, twenty kilometers west of the Rancho Barranacas, long disputed in the Mexican courts, was decided by Judge Rafael Castillo of Juarez, in favor of the American claimants, L. H. Davis and Dan Kelly of El Paso against Don Joaquin Duran of Chihuahua.

Coahuila.—It is reported that the Ramon Corona mines of the Naica district are shipping regularly to the Torreon smelter, and that on the 700-foot level ore has been struck running as high as seventy per cent. lead and two kilos silver.—Sixty-six bars of silver, worth $104,000, have been sent to Philadelphia from the Cia. Rio Grande y Dolores, de Londres, a London Mining Company, operating in the Guerrero district.—The Continental Mining Company, one of the largest copper shippers in the state, is diverting its shipments from the Velardena smelter to the Aguascalientes plant of the American Smelting and Refining Company, on account fo a reported shortage of copper ore at the latter place. The Continental company has been shipping at the rate of 200 tons daily from their mines at Panuco.

Durango.—The Penoles Mining Company of Ojuela, is producing 500 tons of ore daily. Owing to increased ship-

ments from other mines the company is enlarging the capacity of its smelter at Mapimi, from 1,500 tons to 2,000 tons.

Guanajuato.—Over 400 pertinencias have been taken up in the La Luz district as a result of the strike of Dr. F. Meickeljohn, who at a depth of 100 feet uncovered ore that assayed five kilos silver and 150 ounces gold.—The San Marcus Mining Company has been organized in Guadalajara to develop 100 pertinencias on Tepehuaje mountain in the Etetlan district, whence ore has assayed twenty-five to fifty per cent. in copper.—Benjamin F. Bivins filed on eighty-nine pertinencias of mineral land in the Santa Rosa district, on which he will prospect for gold veins.—Shewell and Fulton, mining engineers representing New York capitalists, have purchased the San Cayetano, Santa Brigida, Noche Bueno and Patrocina mines in the Santa Rosa district, for which electric light and power have been contracted.

Hidalgo.—Forty-two pertinencias in the Pachuca district are to be developed by Dona Phebe Mining and Milling Company, recently incorporated under the laws of Arizona. Shares are being placed on the market for the purpose of raising funds for installing a complete set of the most up-to-date equipment.

Jalisco.—In the Culebra mine, owned by the Myers Mining and Milling Company, situated near Etzatlan, a meter of ore assaying fifty-nine kilos silver and five to thirty grams gold, has been uncovered.—The Mexican Western Development Company has purchased six old mines in the Bramador camp for $300,000 and a wagon road will be constructed from the mines to the Pacific port of Chamela.

Morelas.—The Santa Rosa Quicksilver Mining Company will soon begin active development of the old quicksilver mine in the Cerro de Tepeopulco, ten miles from Cuernavaca, where ore carrying values as high as twenty per cent. has been found. The company has 100,000 tons of ore averaging two per cent. quicksilver.

Oaxaca.—The Oaxaca Smelting and Refining Company is to be reorganized and placed on a solid basis. The damage caused by the recent explosion will be repaired and the various buildings now under construction, completed as soon as possible. The smelting plant has a demonstrated capacity of 600 tons a day.—The force on the Los Ocotes mines in the Ejutla district, has been materially decreased.

Sonora.—Although a smaller tonnage of ore is being produced by the Greene-Cananea Company, a greater bulk of copper is being turned out by the smelter, this paradox resulting from the present policy of the company to ship only the highest grade of ore. At the smelter many improvements are under way. The No. 6 furnace was recently blown in, while the Nos. 7 and 8 were blown out and the work of dismantling begun.—On the Rey de Oro mine in the Cerro Prieta gold belt, development work in shaft and tunnels is steadily advancing, with several tons of good gold bearing ore on the dump.—A twenty-stamp mill is in operation on the Cerro Prieta property, which is run by electric power from Magdalena.—The ten-stamp mill of the Tucabe mine is idle on account of litigation.—Two carloads of forty tons a week are being sent out to El Paso from the West Cananea mine.—The Sonora Development Company, with forty men employed, has a shaft on the Sulphide claim on the Fortuna property down 175 feet, a shaft on the Azurite down seventy-five feet and a shaft on the Monte Carlo 21 feet deep.—Ore running 800 ounces in silver to the ton is now being shipped from the San Antonio mine of the Boston-Mexican Mines Company.

NEVADA

Churchill County.—The Almanto claim at Fairview passed into the hands of Pittsburg parties for the consideration of something in the neighborhood of $75,000 and stock interests. The sale being under option for some weeks, was expedited by a rich strike made some three weeks ago of a promising ore vein.—The Nevada Dixie Mining Company, owners of the original Carpenter strike at Dixie, will erect a sixty-ton twenty-stamp custom mill and tram.

Esmeralda County.—The owners of the Mohawk mine at Goldfield intend to work all their property through the Mohawk shaft and are accordingly transferring their men to this working.—It is reported that the output of the Goldfield mines and leases was, for the week ending October 12th, 3,877 tons, worth about $382,340, being 100 tons above the production of the preceding week.—One hundred and thirty feet of shaft sunk and timbered in seventeen days is the record of A. G. Goodwill, former foreman of the Curtiss lease on the Mohawk. In twenty days he took out 400 tons of ore that netted his company $800,000.

Humboldt County—The new camp of Natches is promising to become, from present indications, one of the foremost mining towns of Nevada. A mineral zone six to eight miles square is seamed with blue porphyry and quartz ledges heavily impregnated with hematite of iron carrying a large percentage of iron gold that may be seen in the free state on breaking the ore. The camp is twelve miles from the main line of the Southern Pacific railroad.—The pannings, from location holes on the Golden Rule claims, show good coarse gold ore with plenty of fine colors.—On the Yellow Horse claims with the No. 1 shaft down about twelve feet a ledge about three and one-half feet wide of cube iron sprinkled with free gold has been opened up. The ore is being sacked for shipment.—On the Huston No. 6 a six by twelve foot shaft is being sunk and at a depth of only six feet silver and cube lead has been revealed which also runs highly in gold. The assays were $780 in silver and $560 in gold.—At Butchers Springs, two miles and a half from here, prospectors are panning out some rich pay dirt.

Lander County.—The Pedro company of Battle mountain, has been incoporated with 1,000,000 shares at a par value of $1 per share, 400,000 being for sale, to realize funds for the purchase of equipment. The mine of the company has a strong contact of promising sulphide ore, 4,800 tons of which have been blocked out, worth about $15 per ton.—A ten-foot body of ore has been met with in tunnel No. 7 on the Little Giant mine that assayed forty per cent. lead, 250 ounces silver and $4.20 to the ton in gold.

Lincoln County.—Since the advent of cold weather three shifts have been put on the mills of this district. The Philadelphia mine of Searchlight has sunk three shafts to the water level and a good tonnage of ore is being taken out.—The Quartette Extension consisting of six claims adjoining the Quartette has started active operations.

NEW MEXICO

Grant County. — The Dark Horse mine, discovered by a prospector searching for water, and now owned by Theodore W. Carter and Company, has a vein six to eight feet wide that carries from eighteen inches to two feet of silver ore, assaying $100 to the ton. Night and day shifts are being worked on the mine.—The Tulloch Gold and Copper Mining Company has fifteen favorable looking copper, gold and silver claims on Edith mountain in the White Signal district. The Dagger Point shaft, at a depth of fifty feet, has produced fourteen per cent. copper ore. The Wild Horse claim, the most extensively developed of the group, has a seventy-foot tunnel running along a 3,000-foot dyke of iron gossan.—The Copper Deposits claims have

an abundance of good copper in sight at a depth of only thirty feet.—With the new hoist on the Ocala property in the Burro mountains working to the satisfaction of the management, the shaft now being straightened and retimbered, will be sunk to a depth of 500 feet.—Although handicapped by insufficient funds the Golconda tunnel in the mountain district, is being actively driven. The shipping ore runs 200 ounces in silver to the ton.—It is rumored that George Robinson has struck silver ore on the north extension of the Grub Stake mine, assaying $1,280 to the ton.—It is reported that good ore has been met on the Old Man mine in the Bear mountain district, recently let out on lease and bond.— The largest stockholders of the Bessemer Mining and Smelting Company, D. M. Barringer of Philadelphia, and John Brockman of Los Angeles, have been inspecting the company's holdings at Fierro with a view to erecting a smelter plant.—The Burro Mountain Mining Company is employing but eight men at present.—A winze from the 155-foot level of the Oquawka mine of the Comanche company has reached a fine grade of copper ore.—A new smelter by which it is proposed to make five and seven per cent. copper, a large paying proposition is the invention of Dr. Oliver Dawson of El Paso, Texas, who is enlisting the attention of local mining men.—The Comanche smelter is again running after, a shut down of a few days, due to the lack of sulphide ores. Repairs and improvements are under way which will fit the plant in first-class condition for the reception of ores from the adjacent states and territories.

SOUTH DAKOTA

Lawrence County.—The Bald mountain, district, long known as the most prolific metal producer of the Black Hills, but lately sending out only low grade ores, is again forging to the front on the advent of deep mining.—H. S. Vincent is driving a tunnel on the lower quartzite of the Portland and Clinton companies and has now progressed 400 feet. On the upper quartzite there are 250,000 tons of milling ore blocked out.—The Imperial, Reliance and Dividend Companies are probing the lower quarzite in this territory with good showings. — The Lundberg is developing a vertical vein of blue quartz on the Buxton claim.—The Lucky Strike mill on Box Elder creek will be completed by January 1st, with thirty stamps dropping and a capacity of 110 tons a day. A new hoist is also being installed and a dynamo will supply the mill and mine with electric light. A crosscut 400 feet long on the 200-foot level of the mine has struck ore averaging $5 per ton.—Ole Molson, prospecting on his property adjoining the Uncle Sam near Roubaix, uncovered a vein twenty-five feet wide that assays a good value in free gold.—Ed Dryer is developing his ground on Bear Butte creek where indications are favorable for opening into the rich vein of the Clover Leaf.—It is probable that the Bear gulch district in the western part of the Black Hills will be developed by companies now forming.

PERSONALS

George Barns, a well-known mining lawyer of Silverton, is spending several days in the city on legal business. He says the San Juan is all right. They don't care anything about Wall street down there, as they have lots of money and are taking out train loads of the stuff out of which money is made.

Francisco Jose, who resides at Oporto, Portugal, was born in 1788, and is still in the vigor of good health. He served in the Potuguese army, which opposed the invasion of the French under the first Napoleon. Jose is still a good shot and can do a hard day's work in the coal mines of his native country.

R. N. Dickman of Chicago has been examining copper properties in the Goose Creek district in Oregon and the Seven Devils district in Idaho.

John D. Ryan, managing director of the Amalgamated Copper Company, who has been seriously ill at Butte, is now reported to be out of danger.

R. W. Higgins of the American Direct Concentrator Company of New York is putting in a plant at the Gold Hill Copper mines, Gold Hill, N. C.

Edward K. Judd of New York is inspecting operations of the Buffalo & Susquehanna Coal and Coke Company in Clearfield county, Pennsylvania.

Richard B. Stanford, manager of the Siempre Viva Mining Company at Bluefields, Nicaragua, is in Colorado Springs, Colo., where he will spend a short vacation before returning to Central America.

Walter C. Orem has been relived, at his own request, of the management of the Utah Apex mine at Bingham, Utah, and will now devote his entire time to the management of the Nevada-Douglas mines at Yerington, Nevada.

John W. Young has resigned his position as general European manager of the Allis-Chalmers Company and will return to the United States about Dec. 1. After Nov. 1 his address will be at the Engineers' Club, 32 West 40th street, New York.

L. W. Trumbull, mining engineer, has tendered his resignation as professor of mining at the University of Wyoming, to accept the supervision of properties in Sierra county, California. After Dec. 1, his permanent address will be Downieville, California.

G. W. Pope, who has been contractnig agent of the Minneapolis Steel and Machinery Company at Salt Lake for several years, has been promoted to the position of general contracting agent of the same company with headquarters at Minneapolis. Mr. Pope is succeeded at Salt Lake by T. E. Beyer, who has been his assistant.

A. L. McCarty, until recently general superintendent of the Comanche Mining and Smelting Company, Silver City, N. M., J. W. Crowdus, superintendent for Eckles & Co., Chloride Flats, and chief engineer for the Comanche Mining and Smelting Company, and E. P. McCarty, assistant professor of mining engineering at the University of Minnesota, have recently formed an engineering firm with offices in El Paso and Minneapolis.

OIL INDUSTRY OF INDIA.

Large bulk oil installations are at Madras, Calcutta, Karachi, Chittagong and Rangoon. In Burma at present, oil is brought down in iron oil barges or flats from the oil fields at Yenangyoung, Singu and Yenangyat, on the Irrawady river, to the storage tanks in Rangoon. This method of transportation is too expensive, and the company is preparing to lay pipes 300 miles from the oil fields to Rangoon.

The Assam Oil Company at Digboi, is enlarging its plant and otherwise extending operations. It is not generally known how extensive the petroleum refineries of Assam are, nor the importance of the fields.

The Burma and Assam oil industry ought to create a great deal of business for American manufacturers of oil pipe, refining machinery and oil well supplies, for American engineers are largely in charge of the oil operations in India.

The average population of the Witwatersrand gold field at the end of June was 208,438 of whom 18,559 were white, 52,820 yellow, and 137,049 black. On September 18th, Chinese coolies to the number of 2,282 sailed for China.

Dynamite to the amount of 1,844,635 pounds, valued at $186,959, was exported from the United States during July and August, this year.

Coal Mining and Its Branches

Those Interested in the Coal Industry in the Rocky Mountains are Requested to send Mines and Mining Reliable Information on all Subjects of Interest to the Coal Trade

The Coal Fields of Colorado

There are probably ten million acres in the various counties of the state underlaid with coal, bituminous, semi-bituminous, lignite and anthracite. Coal abounds in Laramie, Weld, Boulder, Jefferson, Denver, Arapahoe, Elbert and two or three other counties of Northern Colorado. It is extensively mined in El Paso, Fremont, Huerfano, Las Animas and to some extent in several other counties of Southern Colorado east of the mountains.

On the western slope are the vast deposits of Routt, Gunnison, Pitkin, Eagle, Garfield, Rio Blanco, Grand, Mesa, Delta, Montrose, Ouray, Montezuma, La Plata, Archuleta, and in a half dozen other counties, but of more limited development. Coking coal of the best quality is mined in Gunnison, Pitkin, Garfield, Eagle, La Plata, Huerfano, and to some extent in several other counties. When the great coal areas of Routt county are well under development the vast coal possibilities of the state will begin to be realized.

A decade hence and Colorado will be producing more coal than any other state in the Union, not excepting Pennsylvania. All the parks and plateaus of the Colorado mountains abound in coal inviting development. North park, Middle park, South park, Wet mountain valley, San Louis valley, Grand, Montrose, Montezuma and other valleys show outcroppings of coal that will eventually be developed.

A well known coal and oil miner from Florence, Fremont county, says the United Oil Company of that place has just completed the erection and equipment of an extensive wax works and lubricating department, which will be operated in connection with its refinery. A few days ago the first cake of pure paraffine was moulded. It marks the advent of a new industry in Colorado.

This department at present consists of two buildings, one of which is 240 feet long and eighty feet wide, with a most commodious storage room in the basement. In this building the vats for boiling the oil are stored. Another building, almost as large, contains the freezers, separators and the hydraulic presses.

After the crude petroleum is treated at the refinery and the coal oil and gasoline removed, it is piped into vats contained in the first building mentioned and subjected to a heating and agitation process which thoroughly mixes it.

From here it is taken to the freezers, which solidify the paraffine. It then goes to the separators, which remove the most of the oil from the wax. After this occurs, it is again subject to heat and passed through powerful hydraulic presses, arranged with numerous compartments containing finely woven particle of wax cloth, which removes every particle of wax from the oil. The wax is then passed into a refining machine and comes from here perfectly pure and as white as snow.

The lubricating oil is then carried to other purifying vats, where every particle of foreign or objectionable matter is taken from it. It is then ready for the market, representing one of the highest grades of lubricating oil that is made.

At present the company contemplates the shipment of all wax in bulk, but if the western market warrants it another large building is to be erected and the wax moulded into candles and cakes, wrapped, labeled and boxed ready for handling by the dealer direct to the consumer.

In Colorado, Wyoming, Utah and New Mexico carload after carload of paraffine candles are used in the metalliferous mines, and it is the intention of the company to supply this demand, which in the past has all come from Whiting, Indiana, and other eastern points.

The Florence petroleum, or crude oil, just as it is pumped from the wells, contains about four per cent. paraffine and this in the past has all been wasted and sold with the refuse tar from the refinery at the rate of about $1 per barrel.

Professor F. E. Knoch of Pennsylvania has complete charge of this department and has had a most varied and extensive experience with the oil and refieneries of that state. He claims that the Florence oil turns out the finest grade of paraffine wax and lubricating oil he has yet seen, both products exceeding by about eighty per cent. the eastern samples with which he has been familiar.

This department has added about fifty employes to the force of the United Oil Company, and if the packing and shipping department is added this force will be supplemented with about fifty more.

Fremont county is not only producing a heavy tonnage of coal, but coal oil, paraffine, cement, gold, silver, copper, zinc, lead, fine building and lime stone and other treasures of the earth. The fruit orchards around Canon City and Florence are not excelled in this or any other country. Three or four large smelter plants near Florence point their tall smoke stacks skyward and other industries are rounding into form over there. Her coal mines are being extended and new veins are encountered as development progresses.

The world's production of coal in 1906 amounted to about 1,106,478,707 short tons.

Since 1868, during a period of thirty-nine years, the precentage of the world's total coal produced by the United States has increased from 14.32 to 37 and this country now stands in the lead of the world's coal producers. It has been only eight years since the United States supplanted Great Britain as the leading coal producer, yet the increase in this country has been so enormous that Great Britain can no longer be classed as a competitor. In 1906 the United States produced 43.7 per cent. more coal than Great Britain and eighty-five per cent. more than Germany. Exclusive of Great Britain the United States in 1906 produced more coal than all other countries in the world combined.

It may be also noted that more than ninety-six per cent. of the world's production of coal is mined in countries lying north of the equator, the countries south of the line contributing less than 20,000,000 tons annually.

Detailed statistics of the world's production, by countries, are incorporated in an advance chapter from "Mineral Resources of the United States, Calendar Year 1906," on the production of coal in 1906, by E. W. Parker, chief statistician of the United States geological survey, which will soon be ready for distribution.

CHEAP FUEL IN IRKUTSK.

The wholesale price of coal in Irkutsk, Russia, varies from $3.00 to $3.45 per short ton while the retail price is one kopeck per pood, or 28 cents per ton, more. All the coal used comes from eleven mines nearby, on or near the line of the Trans-Siberian railway. The quality of the coal is said to be uniform, or nearly so, and fairly satisfactory for steam and domestic purposes.

OBITUARY

Colonel Francis Marion Snowden, who died at his brother's home in St. Joseph, Missouri, August 10, 1907, was one of the most conspicuous characters of the San Juan. Although his death occurred nearly three months ago, his friends in Colorado have only heard of it in the last week or two. He was born in Franklin county, Indiana, September 20, 1827, and was therefore nearly eighty years of age. Colonel Snowden had been in failing health for three years, owing to age and the hardships he had endured as a pioneer.

Francis Marion Snowden.

More than thirty-three years ago he packed his blankets from Fort Garland in the San Louis valley into Barker's Park where Silverton now stands. He was the first settler in that wilderness of mountains. In July, 1874, he built a log cabin in the park, now within the confines of Silverton, and still one of the landmarks of this rugged pioneer.

As early as 1846 he crossed the plains, then termed the Great American Desert, lived for a time at Bent's Fort, between where Fort Lyon now stands and Pueblo, then went to Santa Fe, New Mexico, helped build Fort Kearney, Kansas, under Colonel Powel, in 1848. In 1850 Colonel Snowden went to California, when that Eldorado was just beginning to attract the attention of the world. He was not only a pioneer but a trail blazer in a half dozen territories. From California he drifted back to Colorado and was one of the original locators of the townsite of Silverton in 1874.

In company with Dempsey Reese, Thomas Mulholland, N. E. Slaymaker and Thomas Blair, the town of Silverton was platted and the camp was born. As it grew older and stronger Colonel Snowden became its mayor, marshal, trustee and filled other local positions of trust and honor.

A detailed sketch of Colonel Snowden's life would read like the most thrilling novel. Gone are nearly all the older San Juan pioneers, but they have emblazoned a record of their work on these rugged rocks and their good deeds will live for ages after their bones have crumbled in the dust.

William McKissick, who came to Colorado in 1860 from Iowa, died a few days ago at his home in this city at the age of sixty-seven years. He was a member of the Colorado Pioneers' association and was one of the early discoverers of coal in Colorado. He was still interested in Weld county coal mines at the time of his death. He is survived by a son and daughter. Mrs. McKissick died last December.

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John C. Latshaw, chief clerk of the Pacific jurisdiction of the Woodmen of the World, died at his home in this city last week of a complication of ailments, at the age of sixty years. He was a pioneer of Colorado, a well known newspaper man, and had held the position of chief clerk of the Pacific jurisdiction of the Woodmen of the World for ten years. John Latshaw was highly esteemed and had a host of friends. Colorado lost a valuable citizen when he died, and the Woodmen of the World one of its most popular and valuable members.

Dr. John Russell died suddenly at his home in this city Monday of angina pectoris. Dr. Russell was a San Juan pioneer and made a fortune out of the sale of the Golden Wonder mine near Lake City, Hinsdale county, in the early eighties. For more than thirty years he had been identified with mining. Himself and partner, J. D. Coplen, discovered and opened the Silver Link mine, in the Poughkeepsie gulch, Ouray county. This property was subsequently sold by them for $48,000. They sold the Golden Wonder for $110,000 cash, and were still interested in a great copper mine near Globe, Arizona. Dr. Russell was a veteran of the Civil War, and assistant surgeon of the Sixty-fourth New York volunteers. He was a member of Byron L. Carr post G. A. R. of this city and had practiced medicine for forty years. He leaves a widow, and W. S. Russell, a prominent business man of Denver, is a nephew.

THE STOCK AND METAL MARKETS

Colorado Springs

Oct. 30.—The exchange opened with no features, the smallest amount of business being transacted in years. On Tuesday trading opened light with no sales being recorded in the unlisted prospects, and miscellaneous lists. Four stocks were traded on in the mines. On Wednesday stocks remained firm, although none of the stocks showed unusual strength. Following are the quotations:

Mines.

Stock.	Bid.
Acacia	06
Black B.	01
C. C. Con.	03¾
C. K. & N.	05
Dante	05
Dr. Jack Pot	06
Elkton	48
El Paso.	35½
Fanny Rawlins.	06
Findley.	38
Gold Dollar.	06⅛
Gold Sovereign.	03½
Index.	....
Isabella.	22⅝
Jack Pot	03½
Last Dollar.	02
Lexington.	02
Mary McKinney.	25
Mollie Gibson.	....
Moon A.	02
Old Gold.	03½
Pharmacist.	03
Portland	1.00
Prince A.	....
Vindicator.	75
Work.	15

Unlisted.

Stock.	Bid.
Golden Cycle	40
Jennie Sample	....
Jerry Johnson	05
U. G. M.	04

Prospects.

Stock.	Bid.
Agnes	....
American Con.	005
Banner	01
Blue B.	....
Bob Lee	007
Buckhorn	0075
C. C. & M.	008
Coriolanus	....
Creede	....
Des Moines	007
Gold Bond	01½
Gould	01¼
Hart	....
Ida May	01½
Jolly Jane	008
Keystone	....
Little Bessie	....
Little Nell	009
Little Puck	01
Mary Nevin	01⅝
Merrimac	....
New Haven	007
Pilgrim	01
Princess	003
Republic	008
Requa S.	02
Robt. B.	....
Rose Maud	02
Rose Nicol	01
St. Thomas	01
Teutonic	....

Miscellaneous.

Stock.	Bid.
Anchor	001
Aola	....
Black B.	002
Blanche	003
Cable	005
Colo. G. C.	....
Easter B.	002
Fauntleroy	....
Favorite	0015
Flower of West	0065
Golden Age	....
Goldfield	....
Gold Hill	....
Goldstone	....
Grace	002
Greater G. B.	0025
Hayden	....
Hummer	005
Key West	001
Kimberly	....
Kitty	002
Lucrative	002
Marion	....
Matoa	005
Mariposa	003
Marquette	002
Missouri	006
Montreal	005
National	007
Nellie V.	003
O. K.	005
Olive Branch	....
Palace	....
Progress	003
Pinnacle	....
Pointer	....
Pythias	....
Red Spruce	002
Tenderfoot.	0035
Texas Girl	0045
Uncle Sam	002
Volcano	....
Wide Awake	001

New York

Oct. 31.—T. H. Given, H. S. Stewart and E. M. Herr were appointed receivers for the Westinghouse Electric & Manufacturing Company, and William McConway, William H. Donner and E. E. Keller, receivers for the Westinghouse Machine Company by Judge Nathan B. Ewing in United States District Court in Pittsburg last week.

The appointments were made upon the joint petition of representatives of the creditors, stockholders and the companies.

Too rapid expansion, due to the demands of business, was assigned in the proceedings as the cause for the embarrassment of the concerns.

A bond of $100,000 was required of the receivers.

The bankers of Pittsburg have agreed to take care of George Westinghouse. He was able to produce a block of securities so valuable that bankers were surprised. To the bankers' committee he presented a list of securities owned by him, upon which the bankers placed a value of over $16,000,000 even with the market in its present condition. The indebtedness of Westinghouse will not amount to more than $8,000,000, leaving him a clear market margin of a similar amount at least.

It is probable that the affairs of Westinghouse will be placed in the hands of trustees for three years, this being his wish. Bankers have agreed to the plan.

A better feeling of security permeates financial circles since J. P. Morgan, John D. Rockefeller and Secretary of the Treasury Cortelyou took a hand in the proceedings and came to the assistance of the panic-stricken financiers. It will be but a short time until conditions assume their normal state, and the demand for copper will be far greater than ever before. The issuing of clearing house certificates was put into practice in most cities of the country as a means of preventing any drastic action on the part of frightened depositors.

Following are the quotations:

Stock.	Close.
Amalgamated Copper	51⅛
American Smelting	68
American Smelting, pfd.	86
Colorado Fuel & Iron	16
Anaconda Copper	33¾
Republic Steel	13¼
National Lead	37½
National Lead, pfd.	82
U. S. Steel	23⅝
U. S. Steel, pfd.	82⅞
General Electric	108

*Stock.	Bid.
Arizona Commercial	11
Ahmeek	
British Col. Copper	

Mountain	4
Exploration	10
land-Ely	4¾
aly	3⅞
utte	4¾
	3½
Cananea Copper	6⅜
ons. Copper	4
k	5
aw	5
Utah	2⅝
Cons.	6¼
ig	6¼
r & Pittsburg	9¼
pex	2⅞
	1
op.	12 1-16

& Hough.

Boston

31.—The official estimate of 000 gross earnings for the 1 Electric Company for the end November 30th, showing ase of nearly $20,000,000 from 3 total of gross, is in line with dictions of telephone experts e slump in earnings would 1 the last quarter of the year. he nine months ended August e gross sales of the company out fifteen per cent. less than corresponding period of 1906, other words, had averaged at e of about $58,000,000 for the s compared with nearly $70,- for the previous twelve The slump in the last three is entirely the result of the of new orders for telephone as and reflects the rather gen- ndonment of telephone con- n throughout the United

lecrease this year of approxi- $20,00,000, or twenty-eight per gross, is the second actual de- nd the first of more than $1,- in the gross sales of the com- ring the last twelve years. e $69,245,331 sales in 1906, one-third, or say $23,000,000, ade up of "outside" business. l in this outside business were every description made to an American Telephone sub- companies. The Western Elec- s considerable amounts of tele- pparatus abroad, so that only n of the $23,000,000 outside nsisted of general electrical s sold in the United States in ion with the General Electric stinghouse Electric companies. 1906 year the American Tele- ubsidiaries consumed $46,000,- he $69,000,000 gross business tern Electric Company. el Powe robable that the Bell companies' business will not bulk larger than $30,000,000, this estimate being based on the assumption that "outside" gross will be forty per cent. of the entire total, an estimate which seems conservative, in view of the official statement that general electrical business outside of the telephone department is one-third larger than a year ago.

Last December the Western Electric had a total of 26,900 employes on its payrolls. The number on its books at present does not exceed 21,000, a decrease of 6,000 in the last six months.

Following are the quotations:

*Stock.	Bid.
Adventure	1
Arcadian	1
Allouez	22½
Atlantic	10
Bingham	6¼
Boston Con.	11¾
Balaklala	4
Butte Coalition	15¾
Calumet & Hecla	600
Calumet & Arizona	103
Centennial	20½
Copper Range	52¾
Daly-West	10½
Franklin	7½
Granby	80
Isle Royale	15
Las Salle	10½
Mass.	2¾
Michigan	8
Mohawk	45
North Butte	41
Old Dominion	22
Osceola	80
Parrot	10
Quincy	78
Shannon	10½
Tamarack	65
Trinity	65
U. S. Smelting	28¾
U. S. Smelting, pfd.	34¾
Utah Cons.	32¼
Victoria	4
Winona	3¼
Wyandot	50
Wolverine	1.05
Newhouse	7½

*Otis & Hough.

Nevada

San Francisco, Cal., Oct. 31.—Following were the closing quotations on mining stocks today:

Comstock.

Stock.	Bid.
Ohpir.	1.17½
Mexican.	58
Gould & Curry.	15
Cons. Virginia.	55
Savage.	47
Hale & Norcross	....
Yellow Jacket.	1.27½
Belcher.	26
Confidence.	....
Sierra Nevada.	45
Exchequer.	30
Union.	29

Tonopah.

Stock.	Bid.
Tonopah of Nevada	8.00
Montana Tonopah	1.60
Tonopah Extension.	1.10
MacNamara.	17
Midway.	48
Tonopah Belmont	1.05
Tonopah North Star.	10
Ohio Tonopah.	02
West End Cons.	40
Rescue.	04
Golden Anchor.	04
Jim Butler.	44
Cash Boy.	03
Monarch Pittsburg Ext.	03
Montana Midway Ext.	02
Golden Crown.	03

Goldfield.

Stock.	Bid.
Sandstorm.	16
Mohawk.	8.12½
Columbia Mountain.	17
Jumbo Extension.	69
Vernal.	07
Pennsylvania.	01
Kendall.	10
Booth.	22
Blue Bull.	17
Adams.	05
Silver Pick.	23
Nevada Boy.	03
Black Butte Extension.	03
Blue Bell.	06
Dixie.	03
Hibernia.	03
St. Ives.	35
Conqueror.	04
Black Rock.	02
Lone Star.	09
Goldfield Wonder.	....
Potlatch.	....
Oro.	08
Kendall Extension	01
Sandstorm Extension.	....
Mayne.	....
Atlanta.	21
Great Bend.	26
Simmerone.	03
Empire.	04
Red Top Extension.	14
Florence.	2.12½
Diamondfield B. B. Cons.	14
Goldfield Daisy.	60
Laguna.	80
Combination Fraction.	83
Great Bend Extension.	03
Great Bend Annex	....
Black Butte Bonanza.	02
Kewanos.	23
Esmeralda.	04
Portland.	....
Crackerjack.	05
Red Hills.	22
Mohawk Extension.	06

Lou Dillon	05
Yellow Tiger	11
Grandma	06
Silver Pick Extension	03
Yellow Rose	04
Columbia Mountain Ext.	....
Goldfield Cons.	3.87½
Diamondfield Triangle	06

Bullfrog.

Stock.	Bid.
Original	03
Bullfrog Mining	04
Montana Bullfrog	01
National Bank	08
Lige Harris	....
Amethyist	09
Steinway	....
Denver Bullfrog Annex	03
Bonnie Clare	....
Mayflower Cons.	16
Montgomery-Shoshone Ext.	03
Golden Sceptre	03
Montgomery Mountain	....
Bullfrog Diamondfield	....
Homestake Cons.	....
Yankee Girl	02
Nugget	....
Tramp Cons.	17

Manhattan.

Stock.	Bid.
Manhattan Cons.	....
Manhattan M. Co.	03
Gold Wedge	03
Seyler-Humphrey	02
Dexter	09
Little Joe	01
Crescent	01
Combination	01
Granny	17
Little Grey	....
Cowboy	02
Original Manhattan	....
Broncho	03
Pinenut	04
Buffalo	01
Yellow Horse	02

Other Districts.

Stock.	Bid.
Fairview Silver King	....
Fairview Eagle	63
Nevada Hills	....
Pittsburg Silver Peak	81
North Star Wonder	....
Eagle's Nest	26
Alice of Wonder	....

METALS.

New York, Oct. 31.—Lead—Quiet. $4.55@$4.75.

Lake copper.—Steady, $14.00@14.25. Silver, 59¾c.

St. Louis, Oct. 31.—Lead—Dull. $4.45.

Spelter—Dull, $5.20.

Spain produced in 1906 Bessemer steel ingots to the amount of 129,080 tons; open-hearth steel, 129,323 tons; puddled iron, 45,200 tons; and finished iron and steel, 232,000 tons.

Corporation Affairs and Finances

GENERAL ELECTRIC.

Boston.—The official statement, placing the cash balance of the General Electric Company at $8,000,000, reveals a financial strength which the company has never before possessed, as measured by the annual reports for the last seven years. The cash balances at the end of the fiscal year ended January 31st, last, and previous years, have been as follows:

At present (Oct. 23, 1907.)	$8,000,000
January 31st:	
1907	3,910,708
1906	6,356,093
1905	6,529,115
1904	3,289,445
1903	3,632,556
1902	4,058,448
1901	2,373,683

The cash resources of the company at present are more than 100 per cent. greater than they were in January. This is due directly to the offering, in May last, to stockholders, at par, of $13,000,000 five per cent. convertible bonds, of which a fifty per cent. installment was paid on July 20th, and the balance is due January 20th. As a matter of fact, full payment was made on many subscriptions in July, so that instead of $6,500,000 cash, the company actually received more than $9,000,000 leaving the balance to be paid in January about $3,000,000 or $4,000,000.

Directors of the General Electric Company have been harboring their resources for the last six months, and the cash position of the company is the direct outcome of the policy of President Coffin to curtail commitments to a conservative extent.

BANK CLEARINGS.

	1907.	1906.
New York	$181,870,656	$185,751,792
Chicago	47,467,950	37,759,268
Boston	23,415,144	17,293,812
Philadelphia	22,532,951	18,939,484
St. Louis	12,386,401	11,402,292
Baltimore	5,544,986	4,564,417

TOTAL GOLD IMPORTS.

Since Saturday there has been a total of $15,500,000 gold engaged abroad for import. The banks making the engagements are as follows:

City Bank	$ 6,000,000
Lazard Freres	2,000,000
Heidelbach, Ickelheimer & Co.	3,000,000
Hanover National Bank	1,000,000
Guaranty Trust Co.	500,000
Kuhn, Loeb & Co.	1,000,000
Bank of Montreal	1,000,000
Russo-Chinese Bank	1,000,000
Total	$15,500,000

Besides the above, there are several houses at present negotiating to import gold, and further announcements seem assured.

CHICAGO PNEUMATIC TOOL.

Chicago Pneumatic Tool reports for the nine months ended September 30, 1907, as follows:

Profits	$ 727,284
Depreciation, written off, etc.	147,708
Net profits	$ 579,576
Bond interest	86,250
Balance	$ 493,326
Reserve for mtges. assumed	1,004
Balance	$ 492,322
Sinking fund reserve	37,500
Available for dividends	$ 454,822
Dividends	190,063
Surplus for nine months	$ 264,759
Previous surplus	878,409
Total surplus	$1,143,168

NEW YORK SUB-TREASURY.

	Oct. 26	Since Friday
Paid to Banks	$5,924,000	$28,194,000
Rec'd from B'ks	$4,495,000	15,832,000
Banks Gained	$1,429,000	11,362,000

The sub-treasury was debtor at the clearing house on Monday $912,875.

There were no extraordinary items. The banks have gained from the sub-treasury since Friday, chiefly through the deposit of government funds, $11,362,000, and for the same period the sub-treasury was creditor at the clearing house $443,875.

NATIONAL BANK NOTES OUTSTANDING.

Washington—National bank notes outstanding October 26, 1907, were as follows:

Currency	$606,962,141
Gold notes	75,025
Total	$607,037,166
National bank notes issued for six days	$ 6,259,890
National bank notes destroyed six days	6,539,213

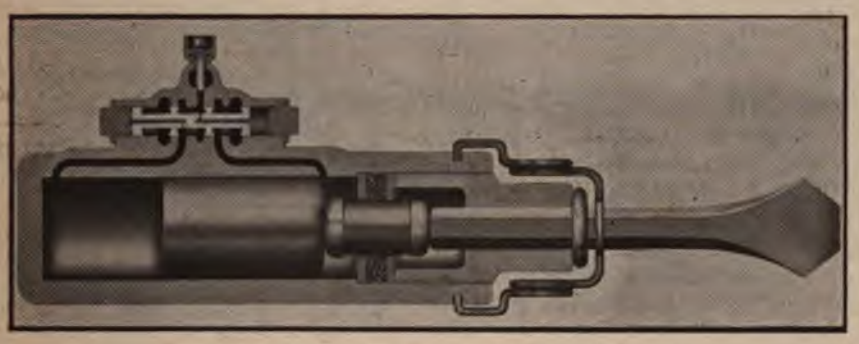
Washington—Over $1,800,000 in national bank notes was shipped to national banks by the treasury on Saturday. Most of it is new circulation and much of it was sent to New York.

MACHINERY AND EQUIPMENT

Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.

A NEW TUNNELING MACHINE.

A new and efficient tunneling machine, adapted to the construction of railway tunnels, sub-ways, conduits, sewers, but especially to mining, is being manufactured by the Proctor Tunneling Company of Denver. The principle of the apparatus is that of the stone cutter at work with a hammer and chisel. A large steel frame, weighing several tons, with a striking face eight feet in diameter, wherein is set thirty sharp chisels, each striking heavy blows with a twenty-pound hammer at the rate of 1,000 to 1,200 blows per minute, while the entire face is slowly revolving, is the manner of the machine's working. The power behind each individual drill is compressed air at a high pressure, 500 horse-power being required to operate the machine under all conditions. The frame advances automatically as the chisels cut out the surface opposed and the waste rock that has been chipped off by the rapidly moving hammers in their continued revolutions, is also automatically lifted to an endless belt receiver which carries the stone to the rear of the appliance and deposits it in the cars, which transport it to the dump. The simplicity of its construction enables the operator to change almost any part of the machine at will and quickly replace any such parts as may be broken or worn out. To direct its course, a spirit level attachment allows as slight a deviation to be made as is desired, and if required, the machine is capable of being turned in a comparatively short space. It is claimed that the appliance can accomplish each day what would take 50 skilled mechanics to perform.



Style of Clipping Element Used in Machine.

NEW PLACER MINING SCHEME.

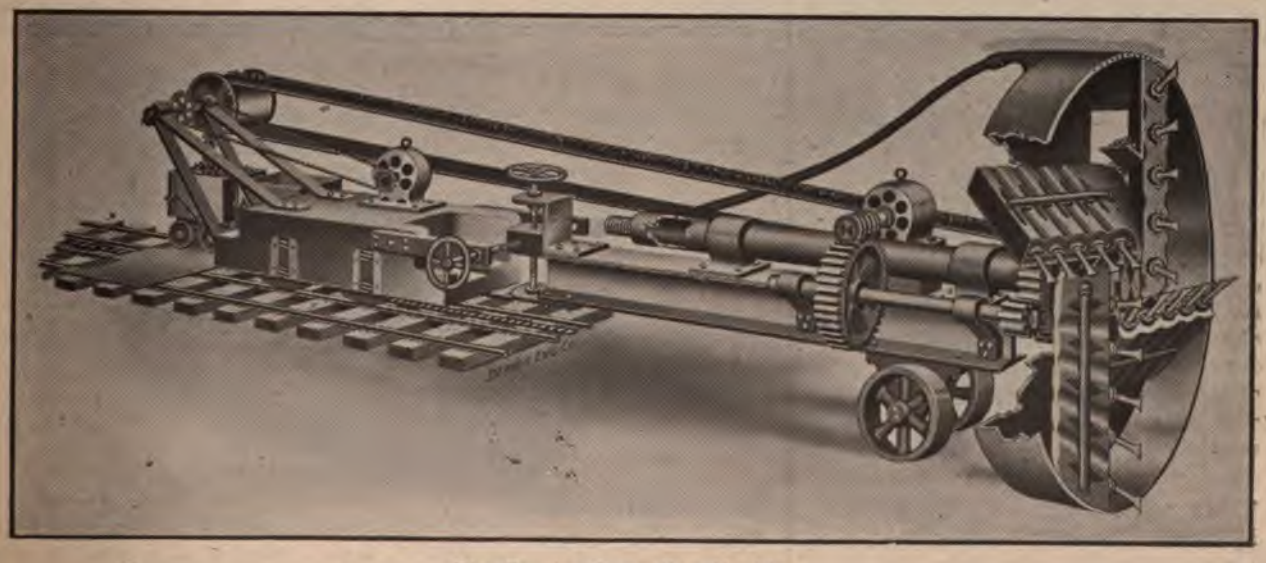
The Downie Wright company of Rapid City, South Dakota, have installed a new system of placer mining machinery that they think will revolutionize placer mining, at least in that section of the country.

The new device consists of four sluice boxes ten feet long and three and a half feet wide, arranged one above the other and each tilted at opposite ends to allow fall enough for the gravel to wash easily from one box to the next. The length of boxes resembles in cattlemens parlance a lazy W.

Above the top sluice box is a funnel shaped box, into which is thrown the dirt, all below this a grizzly to separate the large rocks from the boxes. Power is furnished by a four-horse-power gasoline engine, which keeps the three top boxes shaking constantly like a concentrating table.

A screen, the meshes of which can be changed in size, separates the large pebbles from the sand as it leaves the stationary sluice box on the bottom. The fine sand is washed over an amalgam plate, where the last particles of gold are caught. A small box below the copper plates catches all that is left and the light, valueless sand is washed out of this by the water leaving the plate.

The new features in the machine are that it is unusually light in weight, is built in sections and can be readily moved, its inexpensiveness and re-



The Proctor Tunneling Machine.

quirement of little power, and an almost unlimited fall, while it occupies little space. The sluice boxes are so arranged that they may be tilted at angles varying from twenty to forty degrees, the greater the angle the faster is the dirt handled. It may be operated by either water or gasoline power.

It is the intention of the company to save the black sand which, if it proves of value, will be run over concentrating tables that can be readily installed. It is equipped for an all-winter run, and when severe weather sets in will be housed. Seventy-five men will be employed to keep the machine supplied with dirt from the extensive placer ground holdings the company has secured on Battle creek, three miles below town. The creek bed is full of tailings from the early day workings of the Holy Terror mine, which produced some of the highest grade stuff the Hills ever had. For years men with simple sluice devices have worked the creek bed and made good wages, and it is believed that with the new machine large profits can be obtained from the coarse tailings that years ago could not be handled and were allowed to run to waste. This winter the company will tunnel into the hill near the creek and take their dirt from near the bedrock, and next summer will allow the tunnel to cave in and then wash all the gravel through their mill.

A VEST POCKET STOVE.

William Emmett Enfield of Victor, Colorado, has just received a patent on what he terms the vest pocket camping stove. When the stove is opened up it is two feet in length, one foot high, one foot wide and one inch and a quarter thick. It is made of stove iron, is very thick, and although sectional, will bear over 200 pounds surface weight without bending. Mr. Enfield says a Denver manufacturing firm will take hold of it and put the stove on the market.

AN IMPROVED HEADLIGHT.

On a straight track, locomotive engineers can see the light more than a mile. This is the Electric Headlight recently perfected by B. B. Lacy of the Galveston, Harrisburg and San Antonio railway. Exhaustive service trials have proved that the new device, in reliability and usefulness, is second only to the air brake.

The new headlight is simplicity itself, and it so thoroughly meets railroad conditions that it will stand the jar of a running locomotive and yet produce a powerful concentrated beam of light, uniform and steady.

The more general adoption of electric headlights has been largely retarded by the fact that the types were not sufficiently reliable in operation, and were too fragile and complicated for the genius of the practical railway man in every detail.

It has been demonstrated that the great power of the new light enables engineers to make much better use of the air brakes, so that the trains can be brought to a standstill in time to prevent accidents. Instead of straining his eyes at a poorly lighted point possibly a thousand feet ahead, as is the case with the usual form of oil headlight, the engineer sees clearly, without special effort, not only the rails ahead, but enough of the right-of-way to give him a complete grasp of surrounding conditions.

For furnishing current to run the headlight a small rotary engine is provided, and upon the same base is a direct, connected generator. Working parts are well protected by substantial metal cases and cannot get out of order under ordinary running conditions. As the generator operates only one lamp, the amount of electricity generated is so small that no one could be injured by accidental contact with the circuits.

VANADIUM IN THE UNITED STATES.

Vanadium, one of the rare metals, is used principally for hardening steel, especially in connection with chromium. The addition of a small quantity of vanadium to chrome steel greatly increases its tensile strength, affording a steel that is much used in the axles and other parts of the higher priced automobiles, as well as for stronger parts of other machines.

Roscoelite, a vanadium mica, occurs in commercially valuable deposits in southwestern Colorado, where it was mined and reduced in 1906. The ore contains about two per cent. of the metal. The product, an iron-vanadium compound, has been shipped from the reduction plant at Newmire to Niagara Falls, New York, and smelted by electricity to a ferro-vanadium, which sells for $2.50 a pound of the contained vanadium. Another Colorado plant, at Cedar, produces vanadium as a by-product in the concentration of carnotite ores, about twenty per cent. of the concentrates being vanadium oxide. Vanadinite and other ores of the metal are found in small quantities in Colorado and Utah, as well as in the southwestern states.

Vanadium salts are used in medicine, in ink and dye making, in coloring glass, and in chemistry. Vanadic acid is used as a pigment, affording a golden bronze that is very little inferior to true gold bronze.

There are said to be extensive deposits of manganese ore in Coteaux, province of Cayes, in Haiti. The central point of the deposits lies within 700 meters (9,153 feet) from the coast, and the workable surface dominates in a straight line to the sea coast, thereby making transportation both easy and cheap by means of an aerial tramway. The Haiti government granted a concession for the exploiting of these deposits about three years ago.

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MINES AND MINING

FOURTEENTH YEAR WEEKLY 1893

Vol. 15 1824 CURTIS STREET, DENVER, CO... No. 8

Scientific American Ex
361 Broadway

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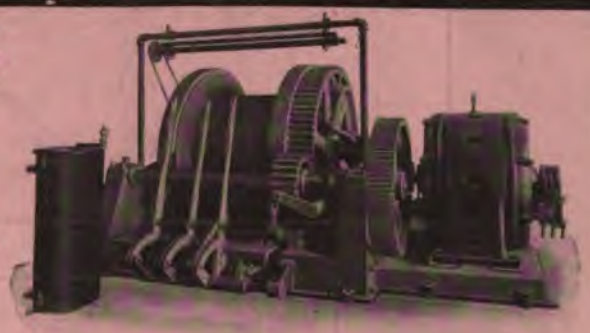

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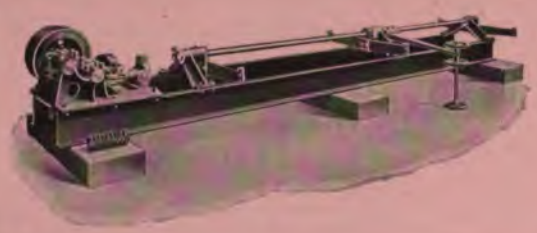
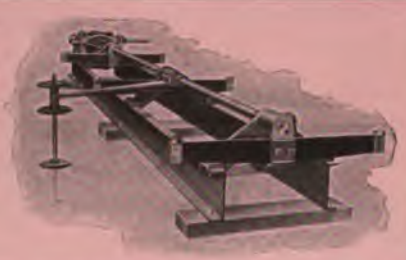


Note the substantial construction of the bed frame, also the head motion.

Note the broad springs by which the table is supported. It can vibrate in only a horizontal plane, and requires no attention or oil.



The Hendrie & Bolthoff Mfg. & Supply Co.

Denver, Colorado, U. S. A.

MINES AND MINING

WEEKLY

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MINES AND MINING

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C. L. HALL.....Editor

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We will be pleased to publish any correspondence relating to mining, milling, metallurgy and kindred subjects, or sharp, clear photographic sketches pertaining to improved machinery, new inventions, mines, mills, smelters, or of any other branch of the mining industry. As a matter of protection and good faith, name and address must accompany such communication.

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A Department of Mining

For the last ten years prominent men throughout the United States, including the American Mining Congress, have been advocating a department of mining in the national government with a cabinet officer at the head of it, the same as that of agriculture, the interior, war, navy, postoffice and other departments of the general government.

Mining has become a vast industry in this country, and it is growing faster than any other industry that is producing the raw material. In dollars and cents it is outranked by the agricultural and manufacturing departments, but for legitimate wealth that has only the earth to thank it certainly ranks next to agriculture. Hundreds of millions annually are added to the wealth of the nation, all of which come out of the earth in their primitive condition, without robbing mankind or preying upon our fellow creatures for an arbitrary profit. We believe the mineral treasures of the earth to be as inexhaustible as the earth itself, and those who dig them out are not only entitled to the gratitude of the government but to all mankind.

During the last quarter of a century mining has made marvelous strides in this country and we are just stepping across the threshold to the mighty possibilities that are beyond. Every hour we are unfolding new treasures in the metalliferous world, and the march of research and development goes steadily on. Our industry is certainly entitled to governmental recognition by a representative of mining in the Cabinet. That branch of the government is already outlined and we predict it will become a law the coming session of Congress.

Electrical Smelting

The experiments in electrical smelting of iron and other ores, both in this country and Mexico, are attracting marked attention throughout the mining world. It has passed the laboratory stage and a most interesting monograph on the progress of electrical smelting in Europe was prepared for the Canadian government a few years ago by Dr. Eugene Haanel, chief of the Bureau of Mines, and the conclusions arrived at were so highly favorble that the Canadian government made a liberal appropriation for some elaborate experiments on a practical scale at Sault Ste. Marie, where a local electrical company furnished the necessary power. These experiments are still under way. Dr. Haanel is authority for the statement that the results have been very successful, particularly so as to the smelting of iron ore and the manufacture of steel. Private enterprise is now erecting a plant at Reeding, California, for the manufacture of iron by electrical smelting and an experimental plant is operated at Syracuse, New York.. If these experimental plants prove what is expected of them the opportunities for the introduction of similar works will be very great, not only in this country, but Mexico and other countries wherever iron and sulphide ores are mined.

A distinguished Mexican engineer declares that along the edge of the Central plateau, both on the Gulf and Pacific coast, are perpetual water powers which can be cheaply developed and in many sections there are important deposits of sulphide ores and iron which can not now be utilized because of cost of transportation and inaccessibility. Some English interests have been investigating the Mexican field with the view of introducing electrical smelting of iron. Great as the possibilities are in connection with the application of this new process to the production of iron there are still greater in the field of treating the vast deposits of low grade copper sulphide ores now available.

The possibilities of electricity in mining and the treatment of ores are just beginning to attract the attention of mining engineers and electricians in this country and Europe. A few years hence and it will be looked upon as one of the most important factors in the mining world.

Production of Coke in 1906

The total production of coke from the beehive and by-product ovens of the United States in 1906 amounted to 36,401,217 short tons, against 32,231,129 short tons in 1905, an increase in 1906 of 4,170,088 short tons, or 12.94 per cent., surpassing all previous records

in the history of coke making in the United States.

Of the total output 31,843,090 short tons were produced in beehive ovens, against 28,768,781 short tons in 1905. The production from retort or by-product ovens in 1906 was 4,588,127 short tons, against 3,462,348 tons in 1905, the increase in the production of beehive coke being 3,074,309 tons, while the increase in the retort-oven product was 1,095,779 short tons. It thus appears that while the total production from retort ovens in 1906 was only about 12 per cent. of the total output, more than 25 per cent. of the total increase was in by-product coke.

The value of the total coke product in 1906 increased in even greater proportion than the tonnage, from $72,476,196 in 1905 to $91,608,034 in 1906, a gain of $19,131,838, or 26 per cent., as compared with an increase of 12.94 per cent. in quantity. The value of the product in 1906 was nearly double that of 1904, when the production amounted to 23,661,106 short tons, compared with which the production in 1906 shows an increase of 12,740,111 tons, a little over 50 per cent.

The increased production in 1906 and the larger proportionate increase in value were due primarily to the continued extraordinary demand created by the unchecked expansion in the production of iron and steel, and also, in a minor degree, to the shortage in anthracite fuel occasioned by the suspension of the operations in the spring of the year and to similar shortages in some of the bituminous coal-producing states.

The average price obtained for coke in 1906 was $2.52, as against $2.25 in 1905, and was the highest figure reached in a period of 27 years with the exception of 1903, when, because of the fuel famine caused by the strikes of 1902, the average price of coke was advanced to $2.63.

In considering the total value and the average selling price of the coke produced in the United States it should be remembered that many of the values are fixed arbitrarily. Many of the coke ovens in this country are operated by large corporations which operate also coal mines and blast furnaces, the coke-making being really only an incidental part of the business. Some of these companies charge the coke product against the furnace department, sometimes at cost, sometimes at a figure based upon the cost of coal mining and coke making plus a percentage of profit on these operations. The value is not fixed by the market price. By other companies the value is estimated upon the average prices for coke of similar quality produced and sold in the immediate vicinity.

The quantity of coal used in the manufacture of coke in 1906 was 55,746,374 short tons, valued at $62,232,524. The value of the coke produced from this coal was $91,608,034, leaving a difference of $29,375,510 to cover the expenses of manufacture and administration and the profits. In 1905 the value of the coal used was $50,614,674, and the value of the coke produced was $72,476,196, a difference of $21,861,522.

Complete statistics in regard to the coke industry in 1906 have been prepared by E. W. Parker, chief statistician of the United States Geological Survey, and will soon be published as an advance chapter from "Mineral Resources of the United States, calendar year 1906."

Report on the Santa Maria Oil District

The Santa Maria oil district of northern Santa Barbara county, Cal., until 1899 entirely unknown as an oil producer, had yielded up to January 1, 1907, more than 9,000,000 barrels of oil, the output for 1906 alone amounting to 4,906,513 barrels. The wells of this district are among the deepest oil producers in the world, one of them reaching a depth of more than 4,400 feet. The total number of wells in the district in the early part of 1907 was 174, of which 94 were producing, 55 were drilling, and 25 had been abandoned. Individual wells furnish from 5 to 3,000 barrels a day, the average being between 300 and 400 barrels.

The great productiveness of the wells, the lightness of the oil (from 14° to 35° Braumé), and the large amount of promising territory outside the developed area give the district a place of great prominence among the oil fields of the West and make information in regard to it especially important.

In the spring and summer of 1906 Messrs. Ralph Arnold and Robert Anderson, geologists of the United States Geological Survey, made a thorough study of the structure and relations of the oil-bearing formations of the district, which comprises the Santa Maria, Lompoc, Arroyo Grande, and Husasna fields, and immediately thereafter prepared a preliminary paper embodying the facts most pertinent to the oil developments. This preliminary report, which was published by the Survey as Bulletin No. 317, is now supplemented by a more detailed account of the topography, geology, and general structural relations of the oil rocks, issued as Bulletin No. 322. Both of these reports may be obtained by applying to the director of the Survey at Washington, D. C.

The district yields four distinct grades of petroleum in addition to the heavy oil that flows from springs or collects as asphalt deposits, and the oil is invariably accompanied by considerable quantities of natural gas. Indeed, the gas is somewhat more widely distributed than the oil, as it occurs in many places in shales above the oil-yielding zone and in some wells that have yielded no petroleum. The petroleums, nearly all of which are dark brown in color, vary widely in their physical and chemical properties and are utilized in many ways, the lighter oils usually for refining the heavier for full, road dressing, etc. Great deposits of asphalt are also associated with the petroleum-bearing formations.

With the exception of a very small amount used locally, all of the oil is sent out of the district, the greater part of the product at present, it is believed, going to refineries near San Francisco. The storage facilities comprise steel and wooden tanks having a total capacity of 1,464,000 barrels, in addition to open earthenware reservoirs located in the field for temporary or emergency use. Pipe lines, tank cars, and tank steamers furnish transportation.

Although the production of oil in the region has increased rapidly, the actual output does not indicate the capacity of the district. Inadequate storage and transportation facilities and the low price of crude petroleum have kept down the amount produced and marketed, and only a few of the interested companies have pushed production up to the limit of capacity for any length of time. Most of the oil from the district is refined, the lighter products being used for illuminants and for the direct generation of power in gas engines, and the heavier products for fuel, lubricants, etc. Contracts recently made in South America, Japan, and the Hawaiian Islands indicate that within a short time much of the product of the Santa Maria district will be exported.

Bleaching powder, used to some extent in the chlorination process for treating gold ore, was imported into the United States to the amount of 83,982,845 lbs., valued at $695,291, for the nine months ending with September last. Compared with last year there is shown an increase of 5,663,844 lbs., or $55,956, notwithstanding the duty of 0.2 cent per pound.

The Edwards Ore Roasting Furnace in the New Golden Cycle Mill

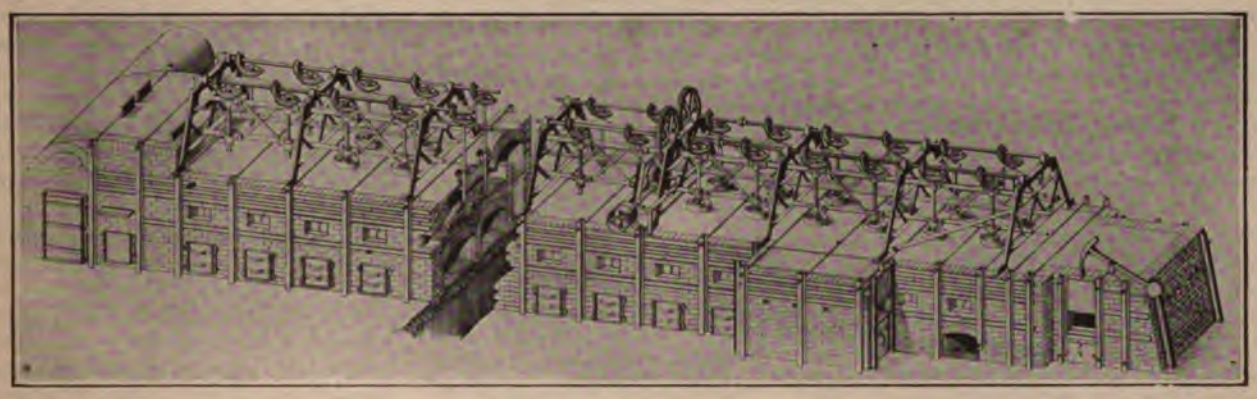
By ALVIN R. KENNER

Since the fire at the Golden Cycle mill the capacity of the plant has been almost doubled, and among the machinery used in the different stages of the treatment, is the Edwards Roasting furnace, which is attracting attention on account of its saving in labor and fuel. The furnace at this Colorado City plant is of the stationary duplex type, with a capacity of 110 tons of Cripple Creek ores per shift of 24 hours. There are eight furnaces in all, giving a total capacity of 880 tons, making the capacity of the plant practically 900 tons. The eight furnaces are all similar, and each has a hearth area of 1,400 square feet, 13 feet in width and 87½ feet in length. The length of each furnace over all is 120 feet, and the width 16 feet. The housing of these requires a building 300x168 feet, built of steel, with corrugated iron walls and roofing.

In order to describe the method of feeding, it is necessary to first explain the stirring of the ore, as the four rabbles at the feed end govern the in-take. The stirring and movement of the ore is done by 54 rabble spindles, standing at right angles to the hearth, and to which are attached in a plane parallel to the hearth, the rabble arms, with every alternating rabble, or tooth, set well back of the others. Of these 54 rabble spindles, 27 are right, and 27 left, i. e., half turn to the right and half to the left, and as the rabble spindles are arranged in pairs, and each pair consists of a right and left rabble (the succeeding pair having their right and left action reversed) the result is, that the circular path of each arm is cut by its neighbors.

Starting with the ore ready for roasting, it is dumped into a hopper, which feeds on to a segment of a cylinder, actuated by an eccentric. This circular segment drops the ore into a pile on top of the furnace, and in a central position with regard to the first four rabble spindles, to which are attached two involute curved strips of iron, which act as scrapers and draw the ore into the four feed holes around the respective rabble spindles. This gives a very even feed and owing to the small drop causes very little dust. The roof measures 20 inches at the feed end, and 24 inches at the discharge end of the hearth level, which is a large factor in utilizing all possible heat. The slope of the hearth, which is one-half inch to the linear foot, and the action of the rabbles gradually bring the ore to the discharge end. At this discharge end occurs one of the three fire boxes, while the other two are placed about 15 feet and 25 feet, respectively, from the discharge end, but on opposite sides. These fire boxes burn lignite coal as fuel, and are semi-gas producers, as they have an injector for steam and air at the side, which enters the fire-box about 2½ feet above the grate bars. These grate bars are water cooled, and are shaken separately, the object being to keep a uniform bed of burning fuel on the grate. The ash door is made air-tight, so that no draught in created, other than the injector. This results in an absence of dust, and the most noticeable feature of the furnace is absence of dust and dirt. The rabbles near the fire boxes are made into a solid arm, instead of separate parts, to lengthen their wearing qualities. All the rabbles are water-cooled, the water entering through the spindle, and emptying into a pan around the spindle shaft. Any part of a rabble can be replaced in from 10 to 15 minutes, as it is made sectionally, and is easily accessible. The four rabbles at the discharge end move twice as fast as the remaining 50, making 6 R. P. M. instead of 3 R. P. M. This increased speed gives the ore a final mixing, and exposes it thoroughly to the heat of the lower fire box.

In discharging, the ore is swept off the hearth by the rabbles, and drops into an 8-inch pipe which has a swinging door on the side, at the bottom, which leads into an incline pipe emptying into the cooling cylinder. The swinging door prevents dust from getting outside the furnace. The cooler is a cylinder, 44 feet long by 2 feet in diameter, and extends back underneath the furnace toward the feed end. The cylinder revolves slowly and is cooled by the jets of water from a trough running along directly over the axis of the cylinder. Enough slope is given this cooling cylinder to cause the ore to gradually discharge at the other end into a conveying belt, which carries it to another part of the plant. The tunnels (underneath each furnace), in which the coolers are placed, are open at both ends and the air enters as a factor in cooling the roasted ore, also. These tunnels, also, make every part of the mechanism of the furnace readily accessible, and easily controlled. The small doors just above the hearth line, and in line with each pair of rabbles likewise make the interior accessible and per-



Edwards Ore Roasting Furnace (Duplex Type.)

mit of a close regulation of the roast. The principal and interesting features of this make of furnace are the almost entire absence of dust, the economy in fuel, and the small amount of labor required to operate it. The mechanism is very simple, and many parts are duplicates of each other, thus making it easy and inexpensive to repair.

The Cripple Creek ores worked at the Golden Cycle mill run about 2 per cent. sulphur, and in the Edwards furnace are reduced to .08 per cent. The power is furnished by electricity and each furnace requires from 7 to 10 h. p., depending upon the character of the roast.

The Nickel Cobalt Industry

By Frank L. Hess.*

During 1906, as for a number of years past, this country imported much more nickel, mostly in the form of matte, than it consumed, so that large quantities of the refined metal were exported. The supplies continue to come from Sudbury, Ontario. Only a small quantity of nickel ore was imported from New Caledonia. Considerable quantities of cobalt are produced at Cobalt, Ont., as a constituent of the rich silver ores. Only one company of the three principal buyers, the Orford Copper Company, is known to pay for, or even to save, the cobalt contents of the ore. The ore is smelted at Copper Cliff, Ont., and gives a partial silver recovery and a highly silver-bearing speiss, which is shipped to Camden, N. J., for further treatment. The ore is paid for at the rate of $30 per ton of ore contains 12 per cent. of cobalt and over, $20 for 10 per cent. and $10 for 6 per cent. ore. A large smelter for the treatment of these ores is being erected at Trout lake, near North bay, Ont., which is intended to have a capacity of 3,000 tons of ore a day.

The uses of nickel are well known. Very large quantities are used in nickel plating; large quantities are consumed also in making armor plate, nickel imparting toughness and hardness to the steel. Considerable quantities are used in coinage, though the ordinary "nickel" of the United States coinage contains only 25 per cent. nickel, the other 75 per cent. being copper. Efforts, thus far unsuccessful, have been made to induce this government to make a coin of pure nickel.

Much interest was aroused in the southern Appalachian states during the year by the apparently authoritative statement that deposits of cobalt were to be found there. Veinlets of titaniferous iron, carrying some cobalt, have been found at a number of places, but so far no considerable deposits have been developed.

Cobalt is used mostly in the form of the oxide, largely for coloring purposes; but this use does not create a large demand.

It has been announced that Thomas A. Edison had perfected a new storage battery, much lighter and more efficient than the older forms, which was in part made of cobalt. In a letter from the Edison laboratory it is stated that the manufacture of this battery had been given up, owing to the high price of cobalt.

Items have been published stating that the cobalt output, for which the demand is at present not very heavy, might be used to advantage in steel. Experiments have been made with cobalt as an alloy for steels, but none of them seems to have been successful enough to call for the manufacture of cobalt steel.

Besides the deposits of nickel and cobalt already mentioned, more or less work has been done on those near Keller, Ferry county, Wash.; Blackbird, Idaho; Mine La Motte, Mo., and Lovelocks, Nevada. So far as known, no work was done at the Gap mine in Pennsylvania, nor in North Carolina.

*Extract from Mineral Resources of U. S. for 1906.

Taking Samples

Some good suggestions have been made by Dr. Richard Beck* relative to the taking of samples by prospectors who have found an ore deposit and have done the first development work. The method of sampling described below is to furnish the basis for a scientific geologic description of the ore occurrence.

1. First of all, make a sketch of the occurrence, even though on the crudest topographic basis denoting on it by figures the points from which the several samples were taken.

2. The corresponding numbers should be at once attached to the samples by means of labels, or, better yet, painted on with cinnabar color when this is possible. These figures are rendered still more indestructible by a varnish or ordinary shellac. The samples should be accompanied by cards bearing the same numbers, or by a corresponding list.

3. A cross-section, be it ever so simple, should always be added and should be inscribed with the corresponding figure.

Next collect:

4. Samples of the undecomposed ore from the deep portion of the deposit; also of the decomposed outcrop.

5. Fresh country rock outcropping at some little distance, and perhaps also decomposed country rock immediately adjoining the deposit from both the underlying and the overlying beds, in hand specimens and also in smaller fragments, suitable for chemical or microscopic examination.

6. The same from eruptive dikes or masses outcropping in the vicinity.

7. Fossils from the fosssiliferous underlying and overlying strata, when such strata are present.

8. Samples of clayey, gougy and gravelly masses connected with the deposit, material to which assayers, too, should pay close attention, despite its apparent worthlessness (for instance, the argentiferous gouge of many occurrences.)

9. In the case of placers, both crude and washed or concentrated material, should be packed in sacks, and when possible, samples of each layer of the cross-section of the placer.

A small, but well selected and labeled collection of this kind, remarks Dr. Beck, may be of greater scientific and perhaps also of more practical value than a large collection assembled without method and improperly labeled or packed.

Only when real mining is carried on will it finally be possible completely to satisfy scientific demands and to obtain larger samples, showing, if possible, both the structure of the occurrence and both selvages, together with the country rock.

*The Nature of Ore Deposits, vol. ii, pp. 668-9.

Twenty million dollars is the latest estimate of the cost of the telegraphers' three months strike. It is estimated that the operators lost about $5,000,000 in wages during the three months over which the strike extended. This applies to the United States. The Western Union and Postal companies in loss of business, extra expense for detective machinery and higher pay to strikebreakers, are estimated to have sustained a loss of probably $15,000,000. The total cost of the strike was close to $20,000,000.

During the eight months ending with August, France imported 9,888,350 tons of coal, against 9,432,130 tons in 1906, principally from Great Britain and Belgium; of coke 1,410,710 tons, against 1,526,580 tons in 1906, and of briquets 444,410 tons, against 359,750 tons in 1906. Exports for the same eight months were 771,400 tons of coal, as against 877,760 tons in 1906; of coke, 99,830 tons, against 108,540 tons in 1906, and of briquets, 63,950 tons, against 81,770 tons in 1906.—French Fuel Trade.

Prolonging the Life of Mine Timbers*

By John M. Nelson, Jr.

The Study.

In the cost of mining and preparing anthracite, timber is a large factor. In 1905 for every ton of coal mined the timber used cost eight cents, while the annual timber consumption for the whole anthracite region represented the cutting of approximately 150,000 acres of forest. Mine operators know that the rapidly increasing price and the decreasing supply of timber demand that every stick used either outside or inside the mines should be so handled as to give the greatest possible service.

In 1906 the Forest Service, in cooperation with the Philadelphia & Reading Coal & Iron Company, planned and carried on a series of experiments to determine the best methods of prolonging the life of mine timber. The results of the study are contained in this circular.

Factors Destructive to Anthracite Mine Timber.

Forty-five per cent. of mine timber is destroyed by decay, while breakage, wear and insects together destroy the remainder. (See Fig. 1.) It is decay and its prevention in which the Forest Service is more especially interested. By direct experiment it is being shown that both oils and chemical salts, and the precaution of peeling and seasoning, prolong the life of the timber. The point of first practical importance, then, is: What method of handling and what preservative treatment will give the greatest service at the least expense?

Decay.

Decay or rot is produced solely by certain organisms called bacteria and fungi. The species of fungi most destructive to mine timbers are Fomes annosus and Polystictus versicolor, of which the former is confined almost exclusively to the pines, and the latter is common in red and black oaks.

Germs or spores which produce decay may gain access to the timber at any time before or after it is cut, though for the most part the disease is contracted in the mines from decaying timber near by. In untreated timber, rough surfaces of bark and wood furnish a foothold for the spores, which subsequently germinate and attack the wood tissues. Spores may also enter timber only superficially treated through checks, cracks or nail wounds.

For a fungus to exist it must have a definite amount of air and water, food and heat. If mining conditions were such that the timber would be kept always wet or always dry, it would never decay. It is the alternating wet and dry conditions or continuous dampness which produce rot.

Ventilation is a very large factor in the life of mine timber. Poorly ventilated gangways and air passages, with a fair degree of moisture and a fairly high temperature, are favorable to fungous growth, and hence to rapid decay.

It is probably impossible to exterminate disease and so wholly to prevent decay in mine timber. Right preservative treatment, together with careful handling of the timber, will, however, reduce both to a minimum.

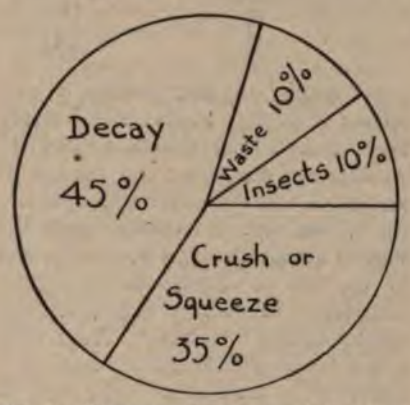


Fig. 1.—Diagram showing relative importance of the causes of destruction of mine timbers.

Breakage.

A large percentage of the gangway timber used in anthracite mines is broken by the "squeeze" and "crush" of coal and rock. Where timber is certain to be broken in a few days or weeks, expensive preservative treatment would not be economical. However, in many situations the timber is broken only after it has been greatly weakened by decay, and for these cases an inexpensive form of treatment may very properly be considered.

Wear.

Cross-ties in main haulage ways are constantly worn by the rails and by the feet of mules. Wooden rollers, drum laggings, etc., have to be replaced when worn by the constant contact of ropes and cables. A preservative treatment is obviously not suitable for timber subjected to this sort of wear.

Insects.

The important part which insects play in the destruction of mine timbers is rarely realized. They are for the most part brought into the mines with the timber. Regular and thorough inspection and the rigid condemnation of insect-infested timber would therefore greatly reduce the loss from this source.

Insects bore into sound wood and greatly weaken it, and, moreover, leave holes or galleries which encourage the entrance of wood-destroying fungi. A good preservative treatment will protect the timber from insect attack, as well as prevent decay. If the bark is removed from timber soon after it is cut, it will not be attacked by wood-boring insects until the wood becomes old and dry, after which it may be attacked by "powder post" and other borers.

Waste.

In the handling of timber for its many uses in the mines there is some unnecessary waste. Though decay or a fracture is often confined to but one part of a set, the entire set is rendered useless. Therefore, if it is possible to preserve the threatened part, the whole prop or set may be saved. Again, in certain situations the sizes of mine timbers may often be materially reduced, provided they are kept sound. Under present conditions the timber is often large enough to do its work after decay has progressed to a considerable depth. Instead of offsetting this decay with sizes larger than necessary, smaller treated timbers may be used with economy.

The utilization of waste mining timber has been carefully investigated. Short sections of broken and partially decayed round timber have been split into laggings with some success. Worn-out and broken planks, sills, rollers, etc., have been profitably disposed of to railroad companies as fuel wood for locomotives with the additional benefit of cleaning up around the collieries. Worn-out drum laggings and short ends of sound gangway timber, formerly regarded as useless, have been sawed into short mine plank, car lumber, pulley bearers and slab plank. Rough slabs from the mills have been split into laggings and the refuse of the mill consumed as fuel.

The Experiments.

Plan of Experiment—

Sets of round gangway timber averaging thirteen inches in diameter were chosen as a basis for the experimental

*From U. S. Forest Service Circular No. 111.

treating work. These sets, which are used for supporting the main haulage ways, consist of two legs (commonly nine and ten feet long) and a collar (from six to seven feet long). They are usually placed in gangways at intervals of five feet through miles of passages. Each set represents about twenty-six cubic feet of timber, and one gangway frequently contains 1,000 sets. Ten gangways to a colliery is not an unusual number; and since the average life of the timber in these gangways is hardly above two years, the consumption of timber in anthracite operations is vast. (Fig. 2.)

It was early realized by the Forest Service that a successful preservative treatment would effect great saving in the use of this gangway timber, and the chief object of the experimental work was to learn to what extent gangway timber would be benefited by peeling, by seasoning or drying out, and by treating with a wood preservative. The comparative value of different kinds of wood for gangway timber was also considered. Pennsylvania pitch pine (Pinus rigida) and Southern loblolly pine (Pinus taeda) were the principal experimental timbers, since these species furnished the bulk of the round timber used in the mines of the company. Red oak (Quercus rubra) and chestnut (Castanea dentata) were tested as species suitable for planting in the anthracite region of Pennsylvania.

Peeling the Timber.

Experiments have shown that peeled timber is superior in durability to unpeeled timber. The space between the bark and the wood especially favors the development of wood-destroying and is a breeding place for many forms of insect life. When, after placement in the mines, the bark begins to flake off, the timber has already begun to decay. The cost of peeling timber before it goes into the mine ranges from 20 cents to 50 cents per ton of wood, according to local conditions and the kind of timber.

Seasoning the Timber.

Seasoning or drying gives mining timber greater strength and durability. A stick of wet timber has only about one-half the strength of a similar stick absolutely dry. Though it is not practicable for mining companies to hold their timber until it is absolutely air dry, peeled timber will dry out sufficiently in a few months to gain in both strength and durability. From two to four months is necessary for proper seasoning.

To learn the possible loss in weight in round gangway timber, due to peeling and seasoning, a test was conducted at one of the collieries of the company. Representative sticks of Southern loblolly pine, averaging from eleven to thirteen inches in diameter and from nine to ten feet in length, were chosen. This timber was weighed immediately before and after peeling, to determine the weight of the bark. It was then weighed every two weeks until seasoned, to learn the weight of the water evaporated. The time of the year greatly favored rapid seasoning. The short lengths into which the timber was sawed gave a large drying surface in proportion to volume, and longer sticks would season more slowly. (Fig. 3.) Table 1 gives a synopsis of this test.

Table 1.—Peeling and Seasoning Test, Southern Loblolly Pine Round Timber, April 17 to July 24, 1906.

	Per cent.
Total loss of green weight by peeling	8.1
Total loss of green weight by seasoning	35.1
Peeling and seasoning	43.2

Rate of Seasoning.

Number of days seasoned.	Percentage of green weight lost.	Number of days seasoned.	Percentage of green weight lost.
14	16.2	70	31.4
28	20.5	84	33.7
42	26.2	98	35.1
50	30.3		

If a mining company handles its own timber from the woods to the mines, the saving in freight made possible by peeling and seasoning can readily be estimated. Labor is the principal factor in the cost of peeling, while the cost of seasoning must be represented by the loss of interest on the capital invested in the timber during the seasoning period. However, these additional items of expense are more than offset by a maximum reduction in freight of from 30 to 40 per cent. and by the far better condition of the timber with regard to both its life at the mines and the readiness with which it will take preservative treatment. The peeling of timber at the mines has been unsatisfactory and expensive, because of the limited amount of yard room and the accumulation of bark. The following considerations favor peeling in the woods: (1) The saving in the cost of freight due to peeling and seasoning; (2) the saving of yard room at the mines; and (3) the prevention of fungous disease and insect attack by early peeling.

Treating the Timber.

Peeling and seasoning mine timber unquestionably increase its durability. However, in order to prolong its life to the fullest extent, a preservative treatment is necessary. (Fig. 4.)

Impregnated wood resists decay because the preservative is antiseptic and excludes the moisture necessary for fungus growth. Timber used in the mines was treated with a variety of preservatives under several methods of application. Both green and seasoned timbers were treated to determine both the relative value of the treatments and the best method of handling preparatory to treatment. If treated at all, the timber must be peeled. Table 2 shows: (1) The method of treatment; (2) the preservative applied; (3) the cost of the preservative; (4) the cost of the treatment, both for an average set of gangway timber and per cubic foot.

Brush Treatments.

Brush treatments with both creosote and carbolineum were applied in two coats to the Pennsylvania and Southern pines. A large flat brush and a kettle of the hot preservative are all that is required for this treatment. A very small amount of the preserving fluid suffices, but the cost of application in proportion to the results obtained is considerable. For small individual operators who can not afford the cost of a large plant, brush treatments are feasible and economical.

The disadvantages of brush treatments are:

(1) The difficulty of completely covering the timber and filling all checks and cracks.

(2) The very slight penetration secured. The subsequent checking or

Table 2.—Model and Cost of Treatment of Mine Props.

Method of treatment.	Preservative applied.	Cost of preservative.	Cost of treatment. Per set of gangway timber (25.8 cubic ft.)	Per cubic ft....	Absorption per cubic foot. ... Pounds.
Brush.	Creosote (dead oil of coal tar).	$0.09 per gallon..	$0.40	$0.015	
	Carbolineum.	.70 per gallon..	1.15	.045	
Open tank without pressure.	Salt solution, magnesium chlorid, 15%.	.01 per pound..	.50	.02	
	Zinc chlorid solution, 6%.	.04 per pound..	.90	.035	
	Creosote.	.09 per gallon..	2.85	.11	10
Cylinder with pressure.	Zinc chloride solution, 6%.	.04 per pound..	1.90	.075	
	Creosote.	.09 per gallon..	3.85	.15	10

opening of the timber may often allow disease to pass through the shallow exterior band into the untreated interior wood.

Open-Tank Treatments.

Pitch pine and loblolly pine have been most successfully treated with both creosote (dead oil of coal tar) and a six per cent. solution of zinc chlorid by the open-tank process.

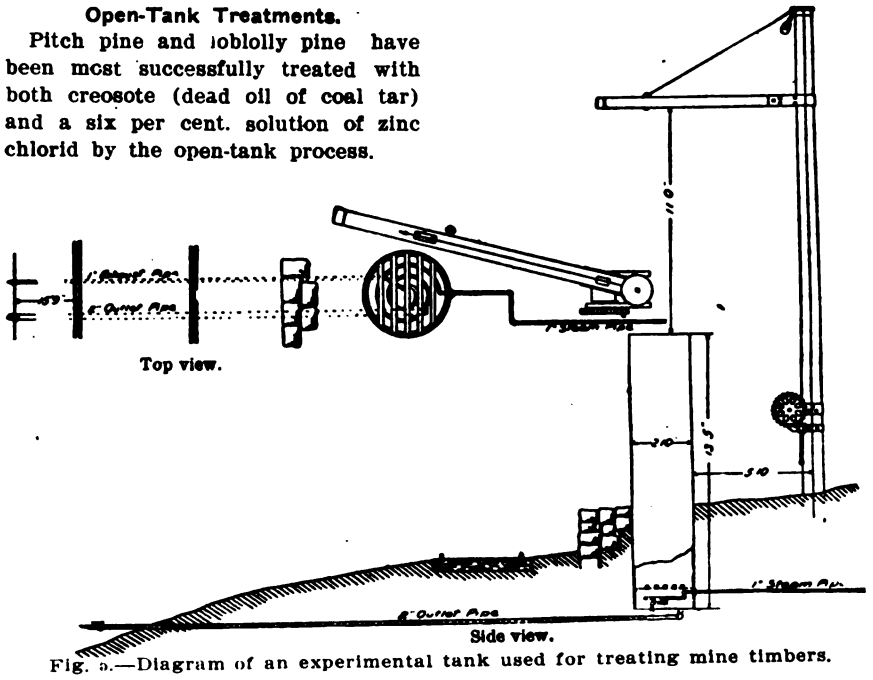


Fig. 5.—Diagram of an experimental tank used for treating mine timbers.

Description of Tank.

The experimental open tank was, for the most part, constructed from old material already in the possession of the company. A section of an old boiler thirty-four inches in diameter and thirteen feet in length was set vertically in the ground to a depth of five feet. This tank had a double bottom, separated by a space of one foot. Between the two bottoms a coil of one-inch pipe twenty feet in length, carrying a steam pressure of 110 pounds per square inch, furnished the heating surface necessary to give the preservative fluid a maximum temperature of 240° F. This coil was connected by a one-inch pipe to a ten-inch steam main seventy-five feet distant. The timbers, which were placed vertically in the tank, were immersed by attaching a circular weight to their lower ends. The timbers were lowered into and hoisted from the tank by means of a small hand derrick with a swinging arm.

Description of the Treatment.

The open-tank treatment as given in this experiment was briefly as follows: Green, partially seasoned and thoroughly seasoned timber was lowered into the tank and immersed in creosote, or in a zinc chlorid or salt solution, at a temperature of from 90° to 120° F. The temperature of the creosote was raised by the coils to from 212° to 220° F., and that of the zinc chlorid or the salt solution to about 212° F. In no case, however, was the temperature allowed to go above 240° F., for fear of injuring the fiber of the timber and so decreasing its strength. When this hot bath was over the steam was turned off, and the timber was allowed to stand until the liquid cooled to a temperature of from 170° to 100° F. The periods of heat and of cooling were varied for each kind of timber and for each stage of its seasoning. The time required for the cooling operation, which depended largely upon the temperature of the atmosphere, was usually from three to twelve hours. For the whole treatment the time varied from six to twenty hours.

Theory of the Open-Tank Process.

The theory of the open-tank process may be given in a few words. The heat of the preservative expands and expels a portion of the air and water contained in the cellular and intercellular spaces of the wood tissue, and as the preservative cools there is a contraction and condensation of the air and water which remain. To destroy the partial vacuum thus formed, the liquid is forced by atmospheric pressure into the cellular and intercellular spaces, a process aided, of course, by capillary attraction. In point of fact, therefore, the hot bath merely prepares the wood for absorbing the preservative, and the actual impregnation follows as the preservative cools.

The ease and effectiveness with which timber can be treated by this process depend upon the kind of wood and its degree of dryness. In one species the structure of the wood tissues may effectually resist and in another may greatly favor the expulsion of air and water during the hot bath; in seasoned timber air, and in green tim-

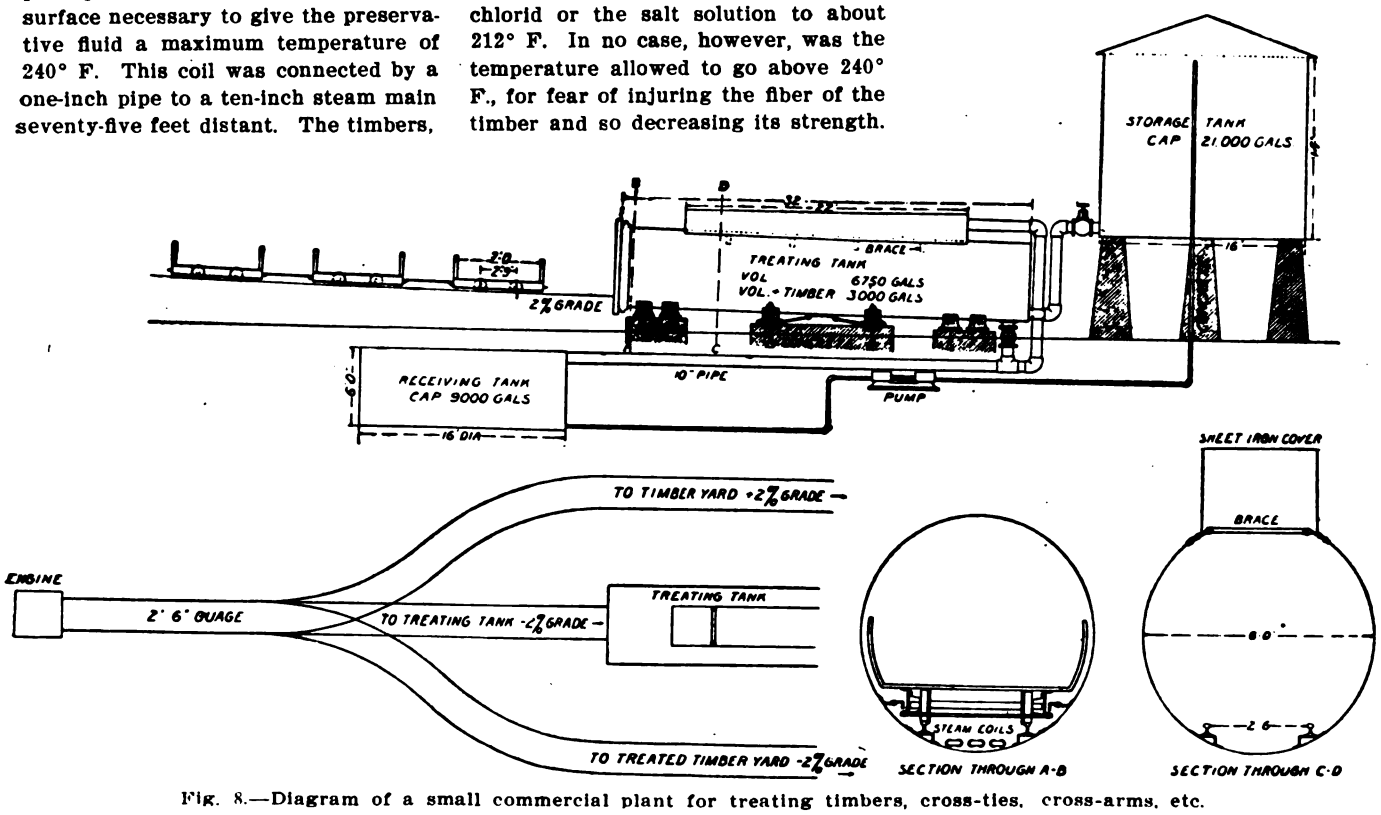


Fig. 8.—Diagram of a small commercial plant for treating timbers, cross-ties, cross-arms, etc.

ber water, is the chief element to be removed before the wood can be impregnated, and since air may be expelled much more easily than water, seasoned timber is the more successfully treated.

Possibilities and Regulations of the Treatment.

Loblólly and pitch pine, among the more important mining timbers of the anthracite region, have been treated by the open-tank process with particular success. By simply immersing the timber first in hot and then in cold preservative fluids, a penetration of from one inch in green timber to from four to five inches in seasoned timber has easily been secured. Aqueous solutions of zinc chlorid and common salt have been absorbed with as much ease as creosote.

In timbers which have a considerable proportion of heartwood the line of demarcation separating heartwood and sapwood is frequently also the line separating the treated and the untreated wood. In past experiments with the open-tank process the heartwood has not been penetrated to a great depth, though this may be accomplished hereafter. The sapwood of chestnut and red oak has been treated with a fair degree of success, but with extremely little penetration of the heartwood.

With absolutely green timber it has been a question of obtaining the greatest possible impregnation in the entire period of treatment (twenty hours). For green timber the period of heat or preparation for treatment has been increased from its usual length (seven hours) to eighteen hours, and this timber has been given two separate entire treatments on successive days without any improvement over the standard treatment of twenty hours.

The treatment of loblolly and pitch pine is regulated by the proportion of heartwood and sapwood contained and the degree of seasoning reached. With a stick of pine absorption is more easily controlled by varying the duration of the cold bath than by varying that of the hot bath. The duration of the hot bath necessary to prepare any form or kind of timber for impregnation is exceedingly variable. Seasoned timber, however, absorbs the cooling preservative with a fair degree of regularity down to a temperature of 120° F. (Fig. 6).

Table 3 gives average and representative treatments of loblolly and pitch pine by the open-tank process.

Summary of the Open-Tank Treatment.

(a) Loblolly and pitch pine can be successfully and economically treated by simple immersion in successive hot and cold baths in an open tank, at a cost of about 11 cents per cubic foot.

(b) Green timber is treated with far more difficulty than seasoned timber. The same application of the hot liquid to green timber slightly reduces its weight and yields no penetration. The same application to seasoned timber slightly increases its weight and gives a slight penetration. Green timber after treatment may show a penetration of one inch without an increase in weight.

(c) The difference in weight of green timber before and after treatment is by no means indicative of the amount of the preservative absorbed. The simple application of the hot liquid to

Table 3.—Average and Representative Treatments of Loblolly and Pitch Pine by the Open Tank Process.

Creosote.

Average Absorption and Penetration, Loblolly Pine (Pinus Tœda.)

Condition of timber.	Absorption per cubic foot. Pounds.	Depth of penetration. Inches.
Green. . . .	5-7	¾-1½
Seasoned (1 to 2 months)	12-15	2-4
Seasoned (3 to 4 months)	20-25	5-Complete.

Representative Individual Runs, Seasoned Loblolly Pine (Nearly all Sapwood.)

Time seasoned.	Total length of treatment.	Duration of hot bath.	Temperature. Average.	Temperature. Maximum.	Absorption per cubic foot.	Penetration.
Months.	Hours.	Hours.	°F.	°F.	Pounds.	Inches.
3	24	7	230	240	22.0	4-5
3	24	4½	225	235	21.5	4-5
3	6½	1¾	178	220	10.7	2-3
3	6	2	173	210	10.7	2-3
3	4¼	1½	174	198	10.2	2-3

TABLE 3.—Average and representative treatment of loblolly and pitch pine by the open-tank process—Continued.

Representative Individual Runs, Seasoned Pitch Pine (Heartwood and Sapwood).

Time seasoned.	Total length of treatment.	Duration of hot bath.	Temperature. Average.	Temperature. Maximum.	Absorption.	Penetration.	Width of sapwood.
Months.	Hours.	Hours.	°F.	°F.	Lbs. per cu. ft.	Inches.	Inches.
4	22	7½	215	240	5½	¾	¾
4	22	7½	218	240	12	1¾	1½
4	22	7¼	209	232	21½	3	2¾

SOLUTION OF ZINC CHLORID (6-8 PER CENT).

Thoroughly Seasoned Loblolly Pine (Nearly All Sapwood).

Total length of treatment.	Lenth of period in hot Solution.	Temperature. Average.	Temperature. Maximum.	Absorption.	Penetration.
Hours.	Hours.	°F.	°F.	Lbs. per cu. ft.	Inches.
20	6	200	210	20	3-5
20	6	200	210	20	4-6

(d) Heartwood of both loblolly pine and pitch pine is penetrated with far more difficulty than is the sapwood of the same species. This is especially the case with pitch pine, which clearly shows after treatment a distinct division between the treated sapwood and the untreated heartwood.

(e) Experiments indicate that for pine timbers of the same degree of dryness or containing equal proportions of heartwood and sapwood impregnation can be regulated by increasing or decreasing the duration of the cooling bath.

Cylinder Treatment.

Loblolly pine gangway timber was treated for experimental purposes in a closed cylinder under pressure. One portion of this timber was treated with twelve pounds of creosote per cubic foot, and the remainder with a five or six per cent. solution of zinc chlorid.

Method of Treatment.

The timber to be treated was loaded on trucks and drawn into a six-foot steel cylinder by means of a wire cable. The doors of the cylinder were closed, and steam was turned in at the required pressure for from four to six hours. When the steam had been allowed to escape and the condensed water in the cylinder to run off, a vacuum of twenty-two inches was applied. During this process steam was passed through the heating coils within the cylinder. The preservative fluid was then run into the cylinder and pressure was applied until the desired absorption was attained.

Comparative Cost of Open-Tank and Cylinder Treatments.

The method of treatment in a closed cylinder under pressure is effective but expensive. Here, as in the previous treatments, the cost of the preservative is a large item, but the cost of application is far greater by the cylinder process than by the others. The saving secured by the open-tank method is due to—

(1) The omission of the steam, vacuum and pressure features of the cylinder process and the elimination of the expensive machinery necessary for those stages of the treatment.

(2) The light construction of the tank, allowed by the lack of strain on the walls.

(3) The small amount of labor required in the operation of an open-

tank plant, due to the simplicity of its construction and method of applying the preservative.

(4) The fact that the cost of construction and maintenance of an open-tank plant is less than one-fifth that of a cylinder plant of equal capacity.

Comparison of Experimental Sets of Gangway Timber.

During the past year (1906-7) gangway timber of various species, peeled and unpeeled, green and seasoned, and treated and untreated, has been placed in gangways in the collieries of the company. (Fig. 7.) Each and every kind and condition of gangway timber has been compared with the timber in most general use in the southern anthracite region, namely, green, unpeeled loblolly and pitch pines. The object of this comparison is to prove exactly to what extent the experimental timber is superior to that at present used. In the course of the experimental work the following comparisons have been made: :

Species compared.	Treatments compared.
Loblolly pine (Pinus tæda).	Brush: Creosote.
Pitch pin (Pinus rigida).	Brush: Carbolineum.
Longleaf pine (Pinus palustris).	Open-tank: Creosote.
Chestnut (Castanea dentata).	Open-tank: Solution of zinc chlorid.
Red oak (Quercus rubra).	Open-tank: Solution of Sodium Chlorid and Magnesium Chlorid.
	Cylinder: Creosote.
	Cylinder: Solution of zinc chlorid.

Keeping Records.

The history of each set of gangway timber and each part of each set has been recorded in writing and on maps. These records include: (1) The date of setting; (2) the colliery; (3) the gangway; (4) the position in the gangway relative to the nearest chute and adjacent set of timber.

Table 4 gives a summary of the experimental sets of timber placed in the mines of the Philadelphia & Reading Coal & Iron Company in 1906:

	Colliery. Silver Creek.	Eagle Hill.	Wadesville.	Total.
Untreated:				
Seasoned peeled	11 loblolly	26 loblolly		37
Green peeled	44 loblolly, 16 longleaf	16 loblolly, 8 longleaf	14 pitch pine.	98
Green unpeeled	112 loblolly, 31 pitch pine, 8 black oak, 1 white oak.	36 loblolly, 7 pitch pine.	26 pitch pine	221
Total untreated				359
Brush treatment:				
Green—				
Carbolineum	14 loblolly	9 loblolly	4 pitch pine	27
Creosote	18 loblolly, 5 chestnut	9 loblolly	6 pitch pine	38
Seasoned—				
Carbolineum	7 loblolly	9 loblolly	6 pitch pine	22
Creosote	9 loblolly	28 loblolly	5 loblolly	
Total brush treatment				129
Tank treatment:				
Green—creosote	104 loblolly, 7 chestnut, 5 pitch pine, 2 black oak.	6 loblolly		124
Seasoned—				
Creosote	20 loblolly, 11 pitch pine.		17 pitch pine	31
Salt			14 loblolly	31
Zinc chlorid	6 loblolly, 5 longleaf			11
Total tank treatment				97
Cylinder treatment, seasoned:				
Creosote	23 loblolly			23
Zinc Chlorid	50 loblolly			50
Total cylinder treatment				73
Grant total				755

Results Derived from Experiments.

Though results so far derived from actual experiments do not cover all classes of mine timber under all conditions, they show that it will unquestionably pay mining companies to peel their round timber, to season it for a few months and to treat it thoroughly with some good preservative. For pitch pine and loblolly pine, the open-tank process with creosote has proved an efficient and economical method of treatment. The preservative value of zinc chlorid for mining purposes is yet to be determined. Gangway timbers treated with creosote by the cylinder process are standing well. Because of its cost, however, this form of treatment should not be considered, unless, in comparison with the far less expensive open-tank method, it gives universally better results. Timbers treated by the brush method with creosote and carbolineum have so far effectively resisted decay. Because of the very simple method of application, brush treatment may prove advantageous for small consumers, or where the timber is in great danger of being broken by excessive crushes.

As a direct result of these co-operative experiments, the company is considering the advisability of treating their mine timber on a more extensive scale. Plans have been drawn up for the construction and erection of a commercial open-tank wood-preserving plant at one of its collieries. This plant will have a daily capacity of about thirty sets of gangway timber (800 cubic feet), and will be large enough to treat all timber at this colliery except that which is broken or worn out. Creosote or a solution of zinc chlorid, or both, will be the preservative fluids used, although the plant is designed for the use of any preservative which may prove efficient.

A Timber Policy for the Successful Preservative Treatment of Mine Timber.

If a mining company has proved by actual experiment that timber preservation is practical and economical, it should be in a position to carry it out. To do this timber can not be rushed directly from the woods to the mines; there must be time for preparing it for treatment and for treating it. This means the storage of a reserve supply of felled timber at one or more points.

To insure a regular supply of timber for their present and future needs mining companies should purchase and operate tracts of timberland. For such an investment to be permanent, the logging must be carefully and economically done, and the forest protected from fire and managed on sound principles. The timber should be peeled immediately upon being felled in the woods, and allowed to season while waiting on cars for shipment. In this way freight charges on bark and a portion of the water present in green wood will be saved and the timber will be rendered more resistant to decay. In may cases the time consumed before and during transportation may be enough to season the timber sufficiently to prepare it for preservative treatment on its arrival at the mines.

A careful and thorough inspection of all timber is strongly recommended. It would be poor economy to apply expensive preservative treatments to defective material. Timber cut from land owned by the mining company should be inspected in the woods or at the point of shipment, to avoid unnecessary freight charges. Timber shipped to the mines by outside parties should be just as carefully inspected. At present, timber is sometimes accepted in such condition that it is doubtful whether its service in the mines would pay for the cost of setting it, exclusive of the cost of the timber. No matter how critical the timber situation may be, it is believed that the policy of accepting everything is a poor one.

More supervision in the setting of mine timber is suggested. A contract system of timbering without proper supervision means setting the greatest amount of timber in the shortest possible time, regardless of where and how the timber is placed. If timber is so placed that it can not properly re-

sist the strains to which it is subjected, and its strength is not utilized, it represents a partial or total loss. If it will pay to treat timber with preservatives in order to resist decay, it will surely pay to handle it right to resist the allied factor of destruction.

It should be borne in mind that the results derived from these experiments are especially applicable to the Pennsylvania and Southern pines used in the anthracite mines of the Schuylkill region. For other forms of mining and in other regions it will be necessary to conduct other experiments to meet local requirements.

Results obtained by actual experiment clearly prove that it will pay mining companies to peel their timber, to season it for several months and to treat it with a good wood preservative. Loblolly and pitch pine have been most successfully preserved by a treatment with creosote in an open tank. This method of treatment is simple and economical. As a direct result of the experimental work the company is considering the advisability of taking up wood-preserving work on a more extensive basis, and has drawn up plans for the erection of an open-tank wood-preserving plant at one of its collieries.

In order to apply a preservative treatment successfully, a mining company must be able to regulate its timber supply. To regulate this timber supply and to make adequate provisions for the future, it is advisable that mining companies own and operate tracts of timberland. By peeling and seasoning timber where it is cut a reduction in freight charges of 30 to 40 per cent. is possible.

The necessary waste timber about the mines can be utilized and the unnecessary waste largely prevented.

A strict and efficient system of inspection for all timber and more care in setting mine timber would result in a considerable economy.

The results obtained from these experiments are more especially applicable to the southern anthracite region of Pennsylvania.

Approved:

W. M. HAYS,

Acting Secretary of Agriculture.

Washington, D. C., August 12, 1907.

Saltpeter to the amount of 15,699,678 lbs., valued at $481,002, was imported into the United States, duty free from India during the months ending with September last. The increase compared with last year is 4,858,046 lbs., or $135,426. Saltpeter is used largely in the manufacture of explosives, also as a fertilizer and for other purposes.

Cochise County, Arizona

(Special Correspondence.)

A new strike of copper ore was made about the 3rd of November in the Empire Copper & Gold Mining Company's property in the Johnson district of the Little Dragoon mountains about five and a half miles from Dragoon Station on the S. P. R. R. The strike was made in the east drift running off the 250-foot level. Large quantities of copper ore were encountered, running on an average of 9 per cent, besides considerable gold and silver.

This mine is well and favorably known in Arizona and from all indications it is destined to become one of the best. A double compartment shaft is down now 250 feet. Over 100 feet of ore is in the shaft and every drift is showing up good values. The company owns twenty-four claims, comprising 480 acres, all highly mineralized. Very little has been said about this mine, but the fact remains that it is a mighty good one and well managed. The machinery, hoists, engines, buildings are all first-class and in splendid condition. All work is being done carefully, scientifically and withall, in a business-like way. The company is out of debt and its management account for every dollar received and disbursed. The recent strike of ore is a realization of the predictions made by several very competent mining engineers who have had occasion to examine the property. Large ore bodies are in sight and much is expected of the property by its many friends. It looks mighty good and a good many are watching it. The Dragoon mountain country will surprise the world some day with its red metal production, and the Empire mine will be one of the leaders.

Tuolumne County, Cal.

(Special Correspondence.)

About twelve miles southeast from Sonora, one of the oldest towns in California, in what is known now as the east belt of the old '49rs mother lode are a number of bang-up good mining properties, among which are the Confidence, Saulsby, Dead Horse, Grizzly, Garfield, Providence, Buchanan and Spring Gulch. The last named mine, from all acounts, is a good one, and unlike many others, is capitalized for the small sum (comparatively) of $250,000.

The Spring Gulch mine is owned by the Spring Hill Mining Company, and consists of four claims—two known as the Spring Gulch, one the Hidden Treasure and one the Canyon mine—all contiguous and on the same vein, and located about three miles southeast of the town of Tuolumne in Tuolumne county.

There are two veins of ore in this property designated as the "hanging" and the "foot wall" veins, twelve feet and eighteen feet thick, respectively. These veins have been opened to the 500 foot level and will average $7 to $8 for the entire body, and will supply a forty-stamp mill for many years. In the hanging wall vein there is a shoot of ore three feet thick that has milled from $40 to $75 per ton. This shoot has been stoped to the 100-foot level, and from the 400 to the 250-level. We have still of this shoot from the 100 to the 250-level and from the 400 to the 500-levels opened up.

The shaft is now down 600 feet and drifting has been commenced on that level. At the 80-foot level there is a drain tunnel, where considerable stoping has been done and which yielded high values. At the north of the shaft the pay shoot is 160 feet long and 18 feet thick and has been stoped from the 100-foot level up. There are drifts and levels, which added to the shaft aggregate a total development of about 2,300 feet.

The equipment consists of one boiler, three engines, one hoist, two cars, skips and a new four-stamp, triple discharge mill with 1,000-pound stamps in two stamp batteries, also a new concentrator, boarding and bunk houses.

The company proposes to erect an up-to-date stamp mill having a capacity of 80 tons a day and also add other machinery. The property is in a good country and well managed. Wood and water are plentiful and facilities excellent.

In copper smelting it is essential that there be enough sulphur in the ores smelted to keep the matte within proper limits as to grade, a good average for matte being about forty-five per cent. copper. Matte much richer than fifty per cent. copper occasions undue waste in slags, while matte running below forty per cent. requires too much time for converting as well as too frequent renewals of converter linings. With the matte within bounds and with normal ores the slag losses in copper and precious metals can be kept within the limits of 0.30 to 0.35 per cent. copper, 0.004 to 0.006 ounces gold, and 0.04 to 0.06 ounces silver per ton of slag. As the slag is about eighty-five to ninety per cent. of the charge, as in the British Columbia smelting practice, the loss per ton of ore is eighty-five to ninety per cent. of the above figure.

Mining Letters from Correspondents

Mines and Mining Wishes to Secure an Actual Reputable Correspondent from the Mining Centers of the World

Denver

Nov. 21.—The flurry of snow that came Sunday night and Monday, followed by colder weather, created an extra demand for coal, overcoats and other necessities. In the mountains the storm was quite heavy, a foot of snow falling in some of the mining camps. It is a slight check to mining operations, but the various districts throughout the state are so well prepared for the winter that a little storm cuts no serious figure, generally speaking.

Miners and all other business men would be glad of the money the banks owe them, with which to carry on their business, but they comprehend the situation, and propose to make the best of a bad break.

Congress convenes early next month and the people may expect relief without unnecessary delay. In the meantime President Roosevelt and Secretary Cortelyou are affording some relief by the issue of the $50,000,000 Panama bonds and the $100,000,000 in interest-bearing government notes. It will help Wall Street and perhaps, to some extent, a few of the other money centers of the East, but what the West and South want is their own money held by Wall Street and other Eastern banks.

In his instructions to Secretary Cortelyou, President Roosevelt declares that he has the assurance from several of the leaders of Congress that they are already considering a currency bill that he believes will meet the situation and prove satisfactory. He declares that what is most needed at the present time is that the people should realize how fundamentally sound business conditions in this country are, and how absurd it is to permit themselves to give in to a panic and create a stringency by hoarding their savings instead of trusting perfectly sound banks. There is no particle of risk involved in letting business take its natural course, and the people can help themselves and the country most by putting back into active circulation the money they are hoarding. The banks and trust companies are solvent. There is more currency in the country todsy than there was a month ago, when the supply was ample. Fifty-five million dollars in gold has been imported, and the government has deposited another $36,000,000. These are facts and I appeal to the public to cooperate with us in restoring normal business conditions.

The government will see that the people do not suffer if only the people themselves will act in a normal way. Crops are good and business conditions are sound; and we should put the money we have into circulation in order to meet the need of our abounding prosperity. There is no analogy at all with the way things were in 1893. On November 30th of that year there was in the treasury but $161,000,000 in gold. On November 14 of this year there was in the treasury $904,000,000 of gold. Ten years ago the circulation per capita was $23.23. It is now $33.23.

The step that you now take, the ability of the government to back them up and the fact that not a particle of risk is involved therein, give the fullest guarantee of sound conditions of our people and the sound condition of our treasury. All that our people have to do now is to go ahead with their normal business in a normal fashion and the whole difficulty disappears, and this end will be achieved at once, if each man will act as he normally does act, and as the relations of the country's business fully warrant his now acting.

The following statement was issued by the secretary of the treasury:

The available cash of the treasury amounting to $240,156,431.85, with the exception of a small working balance, is now on deposit in every state and territory in the union, thus placing it where it can serve the needs of the people as far as possible under existing laws.

The secretary of the treasury, with the approval of the President, has announced an issue of Panama bonds to the extent of $50,000,000. He also, with the approval of the President, availed himself of certain provisions of the law applicable to the treasury in times of emergency.

These provisions are contained in section thirty two of the act of June 13, 1898, authorizing the issuance of interest-bearing certificates of indebtedness, to run for one year. Certificates bearing three per cent. interest will be issued to the extent, if necessary, of $100,000,000. The Panama bonds will serve as a measure of most substantial relief, for among other things, the law expressly provides that they may be used as a basis for additional national bank circulation.

It is the policy of the government and all our people, to see that a vast army of unemployed is not turned into the channels of idleness and kept there any length of time.

An industrious, well paid and well fed people are contented, law-abiding and easily governed. But one or two million people, dependent upon their daily labor for a living, and suddenly thrown out of employment, soon become a revolutionary and dangerous element in any country.

Santa Fe, New Mexico

November 17.—New Mexico does not appear to be seriously hit by the so-called panic. The territory is moving along at about its normal gait, while some of our people speak of it as rather a costly bit of experience for Wall street and a lesson to the entire country. The plungers have been plunging too heavily and it is time they were checked up.

New Mexico, with her great mineral resources, splendid climate, rich agricultural valleys, extensive grazing ranges, vast water powers and other natural advantages, is not going to stop for a little thing like a Wall street financial disturbance. Of course, men will hold back their investments for a short time, and lock up their money temporarily, but we do not believe it will last more than thirty days, and we anticipate congressional aid about the first work of the coming session. The President's one hundred million note scheme, and fifty million Panama bonds, will be but a drop in the bucket and will have very little effect in the West and South. The worst feature of the entire business is the retrenchment that is going on all over the country, and the vast number of people that are being thrown out of employment at the approach of winter, the very time when they need work the most.

In our territory we appear to have money and supplies enough for our most pressing necessities, but there is a feeling of unrest in all departments of business that is not at all wholesome. I suppose it is so all over the country.

R. T. Atwell, United States district attorney for the northern district of Texas, published a statement the other day to the effect that national banks are violating the law and quotes the following to prove it: "'National banking associations shall not issue any other notes for circulation as money than such as are authorized by the provisions of this title.'

"The provisions of the law men-

tioned allow the issuing of certain national bank currency with which we are all familiar and no other. In line with the law, therefore, if because of a money stringency in the northern district of Texas, due to a failure of money centers to pay what they owe our local banks and clearing houses in this district, will not issue any promises to pay or any scrip which violates any of the provisions of the above quoted laws."

Reports from Silver City state that the Comanche Mining & Smelting Company suspended operations entirely last week, and all employes were laid off indefinitely, both in the big smelting plant and in the company's extensive mining properties. The length of the shut-down has not been announced.

It would be useless to deny that Silver City has felt the effects of the recent financial troubles of the east. But it has felt it no worse than any other town of its size in the west, and perhaps not as much, as Silver City does not depend entirely upon Wall street. The drop in copper is felt and has caused the temporary suspension of work of one large company, but there are other large ones, still in the development stage, that are going ahead with their work, notably the Chemung Copper Company, the Copper Gulf Company, and the National Copper Mining Company, in the Burro mountains, the Hermosa Copper company, and the Exploration Syndicate at Copper Flat. The iron mines at Fierro are running with a full force and requiring two trains a day to handle the ore. The cattle season has been good and the prospects for Silver City are encouraging.

Near Springer forty teams and sixty men are at work for the French Land and Irrigation Company on the immense reclamation project in Colfax county. Two cars of machinery arrived there last week accompanied by a big steam ditcher for use in building the irrigation canals. The first work began at reservoir No. 2, where 146,000 cubic yards of earth will have to be removed. Over a million yards will be taken out to build the second of the three reservoirs, the third of which will necessitate the removing of only 32,000 yards. The dam at the first reservoir will contain over a million cubic yards.

The project is one of the greatest ever undertaken in the West. There will be ten miles of big irrigation canals and almost sixty miles of smaller ditches. The company will rush work all winter and have the system in shape to furnish water to the vanguard of the farmers who will colonize tracts to be put under irrigation.

Parties from Carlsbad state that owing to the inability of the Santa Fe railroad to furnish cars, nearly $100,000 worth of cattle, which was to have been shipped, have been turned back on the range and the cattlemen of this section have suffered great loss and inconvenience. Practically all the cattlemen in the Pecos valley district have had orders with the company for two or three months for cars ranging in number from one and two to fifty, and none of the orders have been filled.

It is reported that an order of about 500 cars daily is placed with the Santa Fe Railway Company for cattle cars, through its entire system.

As most of the stock to be shipped consisted of cows and calves, it is safe to presume the average number per car would be about thirty head, and at $18 a head, would amount to an average of $540 per car, and at the least possible estimate of 150 cars, would have amounted to about $81,000, the greater portion of which would have had a tendency to relieve the money situation materially.

The merchants are the ones who will be forced to carry the cattlemen through until the shipping season, next spring, or perhaps, until next fall.

With few exceptions the cattle were all in good condition and would have been unloaded directly upon the Kansas City market. Prices have been fair and while buyers there will be able to supply their wants from other sources, the cattlemen of the Pecos valley are the ones to "hold the sack."

Phœnix, Arizona

Nov. 19.—We think we are hard hit in Arizona by the closing down of some of the largest copper mines in the territory and throwing several thousand men out of employment.

A few months ago it was hard to find miners for the extraction of the copper ores of Arizona, and the spirit of the laboring man was exalted and likewise his wage. All this has changed. Jobs are hard to find now in Arizona and there is little use for the miner to go elsewhere, for conditions are not very different all over the Rocky mountain region. Instead of $4 a day for eight hours of work, it is not unlikely that the wage scale will descend even to $3 and then there will be found plenty of men willing to accept employment. Incidentally, the prosperity of a half dozen important mining towns has been crushed for the time being, and trade generally will suffer.

The worst item proceeds out of Cananea in Northern Sonora, where Col. "Bill" Greene made a millionaire of himself and gave wealth to so many of his friends. During the summer the pay rolls of the camps were understood to carry the names of 6,000 men. Practically all are discharged. Dr. Ricketts, general manager of the Greene-Cananea Company, has stated that the properties of the corporation will all be closed down within two weeks, a course much regretted, but absolutely imperative. The company has an enormous supply of copper on hand and seems absolutely unable to sell any of it. Men have been dropped in bunches during the past month, and at the present time about 2,500 are out of work. These are to be discharged until only 300 remain, the least number necessary to keep the property in good condition. The pumps are being removed from the Capote mine, the main producer, and the lower levels will be allowed to fill with water. Incidentally, this will do some good, as for many months a fire has been burning in the sulphide ore body between the 400 and 500-foot levels. The concentrators, hoisting works, smelters and mining railroad, all will be closed, and $750,000 a month in wages will be lost to the state of Sonora.

Only two furnaces are now being operated, cleaning up the ore in the bins. It had been expected to begin work at once upon a new, modern and economic smelter, to take the place of the reduction works once described by a mining expert as "an animated junk heap," but even this work has been put aside for more favorable times. Curious to note, it is expected that the last month's work of the old smelter will show extremely high return of bullion, for the richer ores have been called upon ever since copper went on the toboggan. Yet it costs the company from 12 cents to 14 cents a pound to make the red metal and it will be disastrous to continue operations with copper drifting around the 12 cent notch, even if the product could be sold.

It is no light blow to pull subsistence away from a community of 30,000 souls, and the only marvel is that it has been done with as little disorder as has been noted. Mexican troops have been thrown into Cananea to assist in preserving order and to guard the mines, but their services have been little needed, though it has been told that actual starvation is confronting a considerable part of the population. The Mexican notoriously lives from hand to mouth, spending what he receives, no matter what the amount may be, and now employment and revenue both have ceased. The American

miners are coming across the border by the trainload and many Mexicans will be drafted into the interior for work upon railroad construction. W. C. Greene is at the camp. It is understood that he has lost a large block of his Greene-Cananea stock, deposited by him as security for New York loans at $10. The stock is now sold as low as $6 a share, a drop of something over $50.

If copper remains low in price, something of the same nature is expected around Clifton, where the companies also are heavy employers of Mexican labor. The mines are all of low grade, the ores worked in the concentrators ranging from three per cent to five per cent. copper. Naturally the most economical working is demanded. The Arizona Copper Company, the Shannon Copper Company, and the Detroit Copper Company have cut wages fifty per cent. to seventy-five per cent. a day, the first wage reduction noted in the territory. The companies are discharging men in squads as well and are cutting out all development work. Little development is needed in that district, for millions of tons of ore are blocked out, ready for stoping. The Shannon Co., has dropped 300 men, about a quarter of its total force, and may close down entirely, as it costs 13 cents a pound to produce metal. However, the entire production of the plant has been sold up to November 1st for 18 cents, so to that time the furnaces were run. The Arizona Copper Company is able to produce at a cost of 9 cents per pound, yet this great property also is easing off its production. The Copper King mine, the main property of the Clifton Copper Company, has been closed down, as well as a number of smaller producers.

At Globe several hundred men have been dropped by the Old Dominion Company, and the mining force will be worked only five days a week, giving Saturdays and Sundays as holidays. The Keystone mine of the company has been shut down and one shift of miners dropped. Only three furnaces will be operated. Despite the worry concerning the continuance of their jobs, the smelter force last Sunday made a record run of the works, turning out 770 bars of blister copper. Many smaller properties in the district have closed down. Those which continue to operate are beginning to lay off shifts, and all have accepted the six-day working week.

From Milwaukee, President D. D. Rose of the Twin Buttes Company has telegraphed Superintendent William McDermott to absolutely shut down all work on the mines south of Tucson. About sixty men have been employed getting out ore for shipment. The train service on the Twin Buttes road hereafter will be only twice a week. The company has been somewhat embarrassed financially, and lately placed a loan in Milwaukee for $100,000, to be used in payment of all outstanding obligations.

Work is proceeding briskly on the Imperial smelter at Sasco, Pima county, where 150 men are at work. E. B. Gage, president of the Imperial Company, states that he has been compelled to reduce the working force at the mines at Silver Bell, owing to the fact that the Douglas smelters would not handle as much ore as has been sent them heretofore. He stated that he expected to re-employ the old force as soon as the smelter is in operation.

The most apparent effect of the copper slump around Bisbee has been the reduction of the output of the Copper Queen and Calumet-Arizona smelters at Douglas and the discharge of 600 smelter employes, about twenty-five per cent. of the force. Assistant Superintendent S. W. French of the Copper Queen and Smelter Superintendent James Wood of the Calumet and Arizona have stated that they expect to make no further reductions, and that they understand that operations will continue about as at present until more favorable conditions exist in the copper market. Yet retrenchment is the order of the day around Bisbee, where a large number of Copper Queen miners are being worked on the installation of a new ore-delivery system, which is to to terminate at the Sacramento shaft, and which is expected to largely reduce the cost of hoisting and handling the product. There is grave fear that the next move will be a drop of wages to no more than $3.50 a day, in addition to the six-day working day already put into effect.

Nothing appears to be known in Bisbee concerning the scheme lately made public whereby the Colorado Fuel and Iron Company reported that it was about to import from Arizona 5,000 miners to take the place of striking members of the United Mine Workers' Association. There is little doubt, however, that this number of men could be secured readily in the southwest. All of the southern Arizona camps, save Globe, are non-union.

About 30 men got their final pay checks last Saturday at Ray and Kelvin, comprising the last survivors of about 800 men who had been employed in the mines along the Gila river in Pinal county. It was a death-blow to Kelvin, yet, like the survivors of the San Francisco earthquake, the trouble was taken with a bold front, and every business house hung out signs. The Chinese restaurant had one, "Me Sellee Cheap." There was crepe on the front of the mercantile establishments and saloons, and inscriptions that told that "Kelvin is not dead, but sleeping,' 'and that "Kelvin was a good old camp, but she fell down." Enormous "For Sale" signs decorated almost every house and shack, and the people met at the thirst emporiums to assure each other that life still remained. About the entire population of the camp is moving to Phoenix.

Only a few weeks ago the new mill of the Ray Consolidated Copper Company was started at Kelvin, crushing 250 tons of ore a day, and the prospect seemed bright that the camp soon would be one of the largest in Arizona. The ore comes from mines around Ray, and though of low grade was susceptible of extremely economical extraction. A narrow-guage railroad has just been completed between the mine and Kelvin, five miles distant.

The closing of the mines at Christmas was the cause of something of a financial disturbance among the creditors of the Saddle Mountain Mining Company. About $40,000 was owed by the company to material men and dealers in Phonix alone, and the total liabilities of the company were many times this amount. There was a meeting of the creditors lately in Phoenix, and an egreement was arrived at looking to the payment of all obligations.

The Copper Butte mine in Pinal county, is closed down, and its management announces that it will take 15 cent copper to start up again.

With the crash in the Westinghouse concerns, back East, has come the stoppage of the mine and smelter of the Duquesne Mining and Reduction Company at Washington Camp, Santa Cruz county, wherein the Westinghouse interests hold all the stock. The plant represents a tremendous investment, a number of plans having been tried, for the home economical working of extremely refractory copper ores, wherein zinc and other base metals are present in extraordinary quantity, judged by Arizona standards. Last year it was announced that all difficulties had been solved by an electric proces of separation, but no extraordinary results have been made manifest.

The mines and works of the Cornelia Company at Ajo, near the international line in Pima county, have laid off most of their men. The company has been experimenting with the Anderson electrolytic copper reduction process with a plant capable of producing five tons of pure copper a day. The experiment has been so successful that the right has been acquired to erect a much larger plant of the same nature.

The Comanche smelter at Silver City has closed down, but it is announced that it will resume operations within thirty days with a capacity of 500 tons a day.

The most serious feature of the depression is the closing down of the Humboldt smelter near Prescott. About 500 men have been thrown out of employment, with a half promise that work will resume November 20th. This is believed hardly possible. Far more important than the loss of wages by the smelter hands to the community is the fact that the smelter permitted the operation of over 100 small mines wherefrom large returns were received by the mine owners, resulting in the most substantial prosperity known to Prescott for twenty years. The Humboldt smelter is controlled by Thomas Lawson of Boston and the stoppage was by his telegraphic order. The company has been in financial straits for several months, and has been very slow in making returns for ore purchased. It has been operating on its own account a number of copper mines near the Grand Canon, which, of course, will be closed down.

At Cumpas, Sonora, the mines and smelter of the Transvaal Copper Company have been shut down. Hundreds of employes being dropped. In the same neighborhood work has been stopped on the Belen and Promotorio mines. On the latter property, preparations had been begun for the building of a smelter, on funds understood to have been furnished by the Phelps-Dodge company to the owner, R. S. Travers.

Joplin, Mo.

Nov. 17.—The American Mining Congress, which has been in session here all the week, wound up its business Saturday and the members returned to their homes and their various avocations.

It was an instructive and profitable session and a dozen able papers were presented for discussion. The next meeting place, as agreed upon almost unanimously, is to be Columbus, Ohio, the western delegates favoring that point, to a man.

The congress unanimously adopted a resolution favoring legislation governing lands, and a resolution indorsing the national association of the state mining schools, and urging that the co-operation of the national administration be secured. The resolution relating to mineral lands especially urges the enactment of laws for the protection of the rights of the people against speculative acquirement of large areas of national domain.

Committee on corporation laws made a report advocating efforts on the part of those engaged in the mining industry to secure the passage of laws providing greater protection for mining investors.

Dr. V. C. Alderson, president of the Colorado School of Mines, made an address on the theme, "What a Profession May Reasonably Expect From the Mining School Graduate."

A resolution was adopted, after considerable opposition, recommending a law in each of the mining states to compel mining engineers to take out licenses for conducting their operations. It was held by many of the minig men that some pose as mining engineers who know nothing or comparatively little, about mining engineering and that there should be a law compelling them to pass an examination and take out a license before operating in a state.

Lander, Wyoming

Nov. 20.—There has been quite a railroad excitement in the state during the past eighteen months. The Wyoming & Southern railway has recently been incorporated with a capitalization of $2,000,000, to build a road from Orin Junction on the Colorado & Southern to the Salt Creek fields, a distance of 100 miles. The promoters of the company are J. H. Lobell and associates, who are interested in central Wyoming oil lands.

The Chicago & Northwestern some time ago built a railroad nearly all the way across Wyoming. The Burlington has built a branch from Frannie into the Big Horn basin, and the Colorado & Southern will some day build north into Montana from Lander, Wyoming. The Denver, Laramie & Northwestern is projected from Denver to Lander, Wyoming, by way of Laramie, and there is a railroad projected from Rawlins, Wyoming, to Steamboat Springs, Colorado.

The Wyoming Short Line railway, capitalized at $2,500,000 to build a road from Wiley, a station on the Burlington in the Big Horn basin, to the eastern line of Yellowstone park. The road is backed by the Big Horn Development Company, which is reclaiming 300,000 acres of land in the vicinity of Wiley. The proposed line will be about fifty miles long and will open up the Wiley, Germania, Burlington and South Fork agricultural districts.

The announcement is made that the Burlington will extend its Guernsey line to the Shoshone reservation. A map of its right of way from Guernsey west to the Platte river and along that stream to Douglas has been filed at Douglas. The proposed road will parallel the Chicago & Northwestern to Casper, and then on west to the Shoshone reservation, where it will connect with the Frannie branch, pushing south from Worland.

The Burlington, more than a year ago, announced that it intended building from Guernsey to Salt Lake City, and the extension of its line across Wyoming is said to be a part of the scheme to carry out the original plan. The money tightness may prevent the completion of the Burlington to Salt Lake City for some time, but it is evident that the company intends to build there, unless it plans to wait for the completion of the Moffat road and use the Denver gateway to Salt Lake City.

It is probable that Kirwin, during the summer and fall one of the busiest mining camps in Wyoming, will be abandoned during the coming winter. Last winter a snowslide partially destroyed the town and killed three of the residents. It is feared that this winter may produce a similar disaster and for that reason it is expected that the mines and business houses will close and practically everybody leave the camp until snow goes in the spring.

Reno, Nevada

Nov. 20.—H. J. Mahen, a millionaire mine owner, who last August bought up all the best property of the rich Tuscarora district, has effected a $12,000,000 merger and is prepared to operate the properties on a gigantic scale. The camp has already produced over $40,000,000 and the deepest workings are only 500 feet.

The merger controls 4,000 acres which contains eighty-five locations of lode and placer. Among the best mines in the consolidation are the Navajo, North Belle Isle, Queen, Grand Prize, Commonwealth, Independent, the Belle Isle and the Defreeze.

It will undoubtedly be a great camp, as it had paid $39,000,000 in thirteen dividends by the time it had reached the 300-foot level. Out of one property $1,890,000 has been taken so far. Al Meyers, a well known mining man of wealth, is heavily interested in this district.

The coming year will see these properties extensively equipped and probably not less than 1,000 men working them. The Tuscarora district by that time will begin to look like it did when 2,000 men were making it hum years ago.

From Goldfield come reports that October was the record breaking month of the year 1907. In the matter of tonnage it far exceeds the score of any other month of this year or any previous year in the history of the camp. The value of its output is ex-

ceeded only by that of the famed express shipments made from the Mohawk leases last year. Not only has October taken the palm for its aggregate tonnage, but has broken all weekly records by the achievement of its final week, ended Saturday, October 26th. The score of this month is symmetrical in its increase from the first to the last of its four weeks, showin respectively 3,764 tons, 3,877 tons, 5,406 tons and 7,190 tons production, making up the total of 20,237 tons high-grade product.

Shipments of Goldfield mines and leases for the forty-three weeks of this year, closing with the final Saturday of October, amount to 95,781 tons. The weekly average for the entire year is 2,227 tons. The record of the last week of October is 223 tons above the average.

By the first of the coming year the Florence company mill will be in operation. No further leases are being granted by the Florence.

Little Florence has declared its fifth dividend, swelling the total to a half-million dollars. Returns on a recent lot of 241 tons shipped show an average value of $271.53 per ton and the four or five feet of ore now being mined runs from $260 to $390.

In the Florence Annex lease on the Florence, at a depth of 300 feet, an eight-foot shoot shows two feet of average $135 ore.

By a cross-cut west on the 400-foot level the syndicate lease on Florence has opened a big body of ore that runs better than $100 in gold per ton and displays copper contents up to six per cent. This lease is sinking for the 500.

Consolidated's regular annual meeting of stockholders is to be held at Evanston, Wyoming, on November 11th, and transfer books will be closed from November 1st to November 12th. H. C. Cutler has succeeded Walter C. Geddes as general superintendent of the Goldfield mines.

Mohawk's main company shaft is sinking now for the 550 level and will later be dropped to the 700, the mechanical equipment being good for a depth of 1,800 feet. Mohawk is shipping on company account a large tonnage of ore that runs from $100 to $150 per ton.

The Mohawk-Combination lease is now sending out about 350 tons daily of average $70 ore, and has enough in sight to maintain an even greater rate until the end of its life, two months hence. Two carloads daily are being shipped by the Begole lease, whose first contribution to the camp's tonnage was made on the first week of October.

Surveys of the Wedge fraction of the Jumbo Extension and Mohawk Number Two of the Consolidated are being made to effect a settlement of the apex controversy, which will very likely be adjusted through arbitration out of court. Meanwhile the five active leases on this strip of Jumbo Extension territory are ordered closed down. This will effect the tonnage record only through the Mohawk-Jumbo lease, which is the only shipper since the week of September 21st, the others being engaged in dead work. They are the Frances-Mohawk, Higginson, Jumbo Annex and Mohawk Ledge leases. However the apex dispute may eventuate, all Jumbo Extension leases will be granted extensions of time to balance their enforced period of idleness.

Sandstorm has again come to the front with a substantial strike of rich ore, uncovered by the Parkison lease on the same block from which Loftus and Davis extracted a quarter of a million of dollars in about a year. The latest exposure shows four feet of dirt that goes from $60 per ton up into the thousands:

Computations upon present production and present possibilities, only, indicate for the next twelve months the following values of output from the ten mines now shipping:

Shippers—	Annual production
Goldfield Consolidated Mines Company	$16,604,640
Jumbo Extension	6,757,920
Florence	1,586,000
Combination Fraction	592,800
Black Butte Consolidated	272,000
Sandstorm	250,000
Daisy	156,000
St. Ives	36,100
Velvet	25,740
May Queen	10,000
Total	$26,291,200

This table contains the names of only such producers as have been in the market since last June. It leaves out of the count Blue Bell, Gold Bar, Great Bend, Simmerone and a half dozen others which are in the intermittent class, but which may join the regulars any week. At this time, Consolidated is confining its attentions to the Mohawk, Combination and Red Top.

All things considered, the developments of another twelve months in Goldfield district may prove this estimate of $26,291,200 annual production as low as was Director of the Mint George Robert's prediction that the gold offerings of all Nevada camps in 1907 might reach a total of $15,000,000.

Salt Lake

Nov. 20.—The smelter, owned by the United States Refining & Mining Company, at Bingham Junction, which employes 1,000 men, and treats from 1,000 to 1,200 tons of ore daily, was closed down last week because of the affirmation of the United States Court of Appeals in the injunction suit against the smelters in what was termed the "smoke cases."

The ore from the the Tintic mines of the company will be diverted to its smelter at Kennett, California. As the other smelters of this valley are turning custom ore away, the closing of the smelter will have a serious effect on the mining business.

The Grand Central mine at Eureka, was closed down early in the month and the lower Mammoth followed soon after. The explanation of this is the fact that no money will be received from the East in payment for the ores that have already been shipped until the end of ninety days and that in the meantime there is not enough money on hand to pay the workmen.

The Mammoth Mining Company received over $100,000 for a single carload of ore which was sent to the smelter last week. There were fifty-three tons of ore in the car and the richest of it carried 145 ounces in gold to the ton. Out of the lot there were eighteen tons that carried 108 ounces gold and then thirteen tons that went better than 21 ounces gold. For the gold values alone the company would receive in excess of $100,000.

The ore was sacked before being placed in the car and the greatest care was exercised, both in the shipping and sampling of the rich ore.

Reports from the mine are to the effect that the streak of ore from which this carload was taken is holding out well and another shipment equally as rich will no doubt be made before many weeks have passed.

Within two years Salt Lake City will have a summer resort on the top of the highest peak between Emigration canon and Big Cottonwood, which will equal the world-renowned Pikes peak of Colorado, according to Frederick G. Bonfils of Denver. Mr. Bonfils, who is here today, said: "The plan has been coming to a head for more than a year, but nothing has been said about it until now, because of its uncertainty. We have been waiting for the development of Salt Lake City and have had our eyes closely trained on the political situation. We are now fully convinced that the city has a great future.

"The cost of constructing the line we have decided upon will not exceed $200,000, and we feel that it can be done for $150,000. The resort would almost pay for itself in a year's time. If it is completed in two years it will be ready for the opening of Salt Lake City as the gateway to the West. The Moffat road and the Western Pacific will be in running order and that will bring all Western travel through Salt Lake City."

Movements in Mining Camps of World

Only Authenticated Reports Will Be Admitted to These Columns

ARIZONA

Cochise County.—With the opportunities offered to workmen by the El Paso & Southwestern Railroad Company and the improvements to be made by the Copper Queen Company the prospects in the Warren district are not much affected by the straitened finances.—Sunday work was commenced in the Copper Queen mines on November 17th, the choice being left by the company to the men, who will thus keep their monthly income up to the same level as before the reduction, when a six day week was in effect. —Miners from all parts of the country, where mines have been shut down, are flocking into this district seeking employment, but are unable to find it, as the present forces in the various workings are amply sufficient.—The directors of the Denn-Arizona and of the Shattuck-Arizona have directed their representatives to close down their properties until after the market depression.—The smaller properties of the district are being developed as usual.

A mortgage for the sum of $50,000 was filed in the recorder's office at Tombstone on the property of the Copper Bell Mining Company in favor of the Shannon Copper Company.—After firing two shots into a ledge on the Kelly-Frazee group of ten claims in the vicinity of the Bisbee extension property, Jack Kelly exposed a vein of copper glance.—The Wolverine and Arizona is operating in high-grade ore, the tunnel now being near the old diamond drill hole —It is reported that at the La Vanita mine, near Benson, the operators are hoisting to the surface of the shaft large blocks of free milling gold ore, which will be reduced to bullion bars at the La Vanita mill. —At the Coffee Cafe lode, one of nine gold claims in the Benson district, owned by A. J. Collins, Steve Roemer and L. D. Redfield, rich samples were taken from a well defined body of ore three feet wide between granite walls at a depth of fourteen feet. Ten tons of free gold ore had been taken out in the last nine feet of sinking. This lode adjoins the La Vanita.—The cross-cut tunnel of the Hub Mining Investment Company in the Valenzuela mining camp is reported as still in good ore and looking better than ever.

Graham County.—The only men now employed in Ray are those engaged in doing assessment work. The Ray Copper Company will keep a small force to exploit the grounds so that as the market rises a large tonnage may be blocked out.—During the month of October the Old Dominion smelter turned out 4,000,000 tons of blister copper, the record monthly production for the Globe district.—It is reported that the members of the Globe Miners' Union have agreed to accept the fifty cent reduction on condition that a six day week be instituted.

Mohave County.—E. E. Morrill of Los Angeles and W. Guearo of Utah, both inexperienced in mining, while examining some newly acquired claims in the Mesquite district, just across the line from Nevada, located a five-foot ledge of lead-silver smelting ore running eighty per cent. lead and fourteen ounces silver to the ton. The claims, which have been named the Gwendolen group, will be immediately developed and a car of ore shipped to Salt Lake.—A ton of ore on the dump of the Little Chief mine, at Stockton Hill, is said to average 700 ounces silver.—The magnetic machine for the Vanderbilt mill is being installed, and as soon as the roaster is in commission the treatment of zinc ores from the Idaho mine will be commenced.—Excellent progress is reported on the copper mines owned by G. W. Jonas, et al., in the Chemehuevis mountains. —Surveyors are at work on the Yucca-McCracken wagon road, which will be graded for a possible railroad branch in the future. The cost of the road will be in the neighborhood of $10,000.—A new mill is being taken from the Yucca station to the San Francisco mine, where the old one formerly used will be put out of commission.—Ore bodies have been struck in both drifts from the bottom of the main shaft of the Treasure Hill property.—It is understood that active work will be instituted on the holdings of James Uncapher and C. E. Sherman in Mineral Park.—Burdon Gaylord has purchased the interests of Williams and Pittman in the wolfram mines in the Aquarius range, where he will soon begin systematic development. — A $25,000 gold bar was recently brought into Kingman from the Gold Road mine, where the mill is reported to be running steadily, but owing to a break in the hoist-shaft work was suspended on the mine.—Prospectors have found a number of gold bearing veins below Kingman, where a future of mining activity seems guaranteed.—The Maguire mine, situated in convenient distance of the railroad, containing one of the largest bodies of gold ore in the territory has started operations and is a great stimulus to mining in this section.—According to John S. Jones, president and general manager of the Jessie Mines Company, with holdings in the Shaparral district, there is enough ore blocked out over the second level, 300 feet deep, to furnish treating material for a 100-stamp mill.—On the De La Fountaine mines larger bodies of lead ore are being opened up.—It is said that when stoping is begun on the Redemption mines at Chloride good shipments of copper ore will be made.—A good force of men is being employed at the Aztec turquoise mines at Mineral Park.—In the bottom of the McKesson shaft lies a body of gold ore under water which will be developed on the arrival of a pump.—It is expected that the Golden Star Mining Company will sink the main shaft of the Gem mine, in Cerbat, below its present level.—The property of W. G. Kelly and associates in Cerbat is to hae a pumping plant installed.—It is understood that F. P. Andreas will put up a milling plant on the Golden Eagle group of mines in the Cerbat range.

Maricopa County.—The Fort Henry Mining Company is the name of a new corporation of Pasadena, Cal., capitalists who will operate on the old Fort Henry property, near Wickenburg, and will install a hoist on the fifty-five foot shaft and connect the property with the old Buckhorn road this winter.—There is considerable activity among the Oro Belle, Tiger and Consolidated Union Grand mines in the Silver mountain section.—The Vulture Peak Copper Company, now organizing, has ore from its holdings on Vulture Peak that assayed 17 to 20 per cent. copper. —Ore from the Copper Giant claim of the Vulture Canyon Company gave returns of 51.8 per cent. copper, $2 in gold and 8.5 ounces silver.—The directors of the Gold Road Mining and Exploration Company have decided to sink the main shaft to a depth of 1,400 feet (600 feet below the present level), which will require the enlargement of the shaft and the installation of an electric hoist with a 2,000-foot sinking capacity. An entirely new mill and the substitution of filters in the place of the present tankage are among the other improvements contemplated.—The great McCracken mines have been sold to the Western Development Company of Chicago, said to be backed by the Armours and Pullmans, who will install machinery and inaugurate ac-

tive development as soon as possible.—In the Fortunatus mines, situated at the north end of the old Cincinnati mine, near Layne springs, and belonging to Dr. L. D. Godshall, a fine showing of lead, which also carries good values in gold and silver, is reported in the adit drift.—The static machines at the Tennessee mills at Chloride are ready to begin operations.

Pima County.—A third shift has been added to the force of the Omega mine in the Santa Rita mountains, where the tunnel is now in 850 feet and promising indications are in sight.—During the month of October three carloads of ore were shipped from the Total Wreck mines, south of Pantano to the Deming sampling works.—These were the only shipments during October in Pima county.

Pinal County.—It is said that the Rothschilds of London are to spend $3,000,000 in developing the Oklahoma mine, where 150 men are now employed in sinking the shaft to the 500-foot level.—George Rockloff of Colorado will spend $50,000 in mining a ledge on Mineral hill, near Florence.—The Cloudburst claim, belonging to the Calumet-Pinal Mines Company, at a depth of 130 feet, is in highly mineralized lime spar.—A recent assay from the Two Queens gold-copper mines, near Winkleman, on a test shipment of 2,044 pounds sent to El Paso, showed values of $32.76 in gold and $3.77 in silver to the ton. This places the mines on a paying basis independent of the copper receipts. — On the American Boy, near Casa Grande, the shaft is down 144 feet in quartz, rhyolite, etc., the principal ores being in schist.—No shipments were made from Casa Grande during October and November.

Santa Cruz County.—A total footage of 853 feet of workings has been completed on the Black Cap mine of the Mansfield company, and both milling and shipping ore is being extracted. The tunnel is in 145 feet southwest of the shaft. During the past month the contractors made a sinking of sixty-four feet on the Sweet mine, where a station at the 350-foot level is to be cut.

Yavapai County.—A power house and camp buildings are to be put up on the grounds of the Haynes Copper Company and $20,000 worth of machinery has been purchased by Manager T. E. Campbell.—A hoisting plant and boiler are being installed on one of the claims of the Mildred Gold Mining Company on Rich hill, in the Weaver district, where a two-foot streak of iron sulphide at a depth of eighty feet, has yielded values of $40 to the ton in gold.—O. B. Marshall, in sinking a twenty-four foot shaft, located between the Lelan and New England Gold and Copper groups, encountered a streak of hematite of iron that gave a rich sampling in free gold and has now widened to eight inches. A carload of ore is being prepared for shipment.—Operations on the Swiss Girl, Laura and Alice mines, belonging to the Baumann Copper Company, in the Agua Fria district, will be resumed about the middle of December and a compressor and ventilating plant will be installed on the Swiss Girl shaft and a hoisting plant on the Alice claim, where the shaft is now at a depth of 208 feet. To realize funds to meet these expenses the stockholders of the company, in a meeting held at the offices in Prescott, decided to increase the capital stock from 600,000 shares to 1,500,000 shares at a par value of $1 each.—It is announced by the manager of the Humboldt smelter that the plant will resume operations on November 12th.—New machinery, including an electric power plant, will be put up on the claims of the Haynes Copper and White Horse mining companies' claims at Jerome.

Yuma County.—Quail hunters in the northern part of this county picked up a piece of quartz float rich in free gold four miles west of Salome, and as a result the hills in that locality are teeming with prospectors, who are daily staking claims. The spot is full of diabase and diorite dikes, which cut the schist in many directions and are attended by stringers, blowouts and ledges.—In the week of November 10th three big placer claims in the San Pablo district were purchased by the Consuela Mines Company of Los Angeles.—The record of a deed from Fred Amavisca and Albert E. Soderman to the Felix Mayhew Free Gold Company for the full premises of the Amavisca strike, was filed during the same week by Senator George H. Barker of Pasadena.

CALIFORNIA

Inyo County.—The Bishop Gold Mining Company is prospecting with a diamond drill and according to latest reports had eucountered, at a depth of fifty-nine feet, ore running $17.25 for the last nine feet.—E. E. Smith, owing, with W. W. Watterson and others, the Ubehebe copper properties, picked up on the ground a piece of black rock which proved to be galena and with further exploration a four-foot ledge of solid galena was exposed on the hill side. The property is very valuable for its lead and silver besides the good copper deposits it contains.—While making a recent survey of the Black Canyon property for government patent the engineers discovered a wide cropping 400 feet from the present workings, surface samples of which ran $9 in gold to the ton. Tunnel development was started at once.—Two assays on ore taken from the first ledge on the True Fissure property, which has been intersected by the main tunnel at a depth of 200 feet, show from $3.75 to$13.71, hespectively. An assay on the bottom of the fifty-foot winze where the second ledge is about three feet wide shows a value of $8.80 a ton. The last assay totalling $67.13 is from a ledge which should be encountered at the 355-foot depth and was taken from the bottom of the 195-foot winze. The ledge varies from one to four feet in width.—S. G. Nims has put up location notices on an old abandoned mine near Floriston and with four men at work has advanced twenty-five feet and has started a crosscut a distance of ten feet on ore which assayed $23.73 in gold with a trace of silver and copper. The owner is organizing the Floriston Gold Mining and Prospecting Company with shares to be soon on the market.

San Bernardino County.—The Vontrigger Gold Mining Company, composed of Long Beach parties, has located three veins of wolframite on its claims located two months ago in the northern part of the county, and a prospect shaft sunk fourteen feet disclosed two feet of ore analyzing thirty-eight to eighty-two per cent. of tungstic acid in the wolframite, besides fair gold values in the accompanying quartz.—Samples of ore running $103 in gold, $30 in copper and $1.35 in silver to the ton, are being brought from a district seven miles from Whipple mountain, twenty-five miles southwest of Needles.

COLORADO

Boulder County.—The incorporation papers of the Black Beauty Mining Company were drawn up last week, a party of Longmont men who will develop a promising property above Wall Street, being the principals.—The Sugar Loaf tunnel is now advanced 700 feet from the portal and is being driven under contract at the rate of forty feet a month, the dimensions being five by seven feet in the clear. It is now within 200 feet of the Lindley ore shoot, higher values resulting with the tunnel's advance. These mines, although containing low grade ores, are capable of a large output which, by the careful and economical methods of the U. S. Gold Corporation, will nevertheless be highly profitable.—Leasers on the Ward Rose are repairing machinery and putting the property in shape

for a good output during the winter. While cleaning out the lower levels William Smith and associates, discovered a fine streak of smelting ore from which they expect soon to make shipments.—George DuBois, who recently opened a new vein on the ground of the Smuggler group at Balarat, took down a sample weighing twenty-nine and three-quarter pounds which netted $20.91, the certificate showing 84.42 ounces gold and 34.14 ounces silver which represents a streak nine inches wide. The balance of the vein—about twenty-seven inches—runs $37.50 to the ton.—The second fifty-ton shipment is being made from the 100-foot level of the Golden Queen and is expected to bring an average of over $50 a ton. With the mine in close touch with the railroad, it bids fair to be a paying proposition.—The Imperial Company, on the north slope of Sunshine mountain, near Rowena, is following a two foot ore vein that pans well in free gold. On the Indicator vein, which is expected to be encountered in about fifty feet, drifting will be done.—The old Boston mill, one mile south of Ward, is to be remodeled for the treatment of custom ores in this district and about twenty men will be employed.—Manager Loach of the Wolf Tongue mill in Nederland, states that in all probability the mill will resume about the first of the month with the same prices to be given.—The Cashier Mining Company, which has for two years exploited the immense lead and silver veins in the Camp Albion district to the north of Arapahoe peak, will have a twenty ton mill in operation at the camp next summer.—The Pine Grove, Nederland, is being unwatered and prepared for winter operations.—The Clarasdorf tungsten mill of Phillip Bauer & Company, on Middle Boulder creek, which is to employ rolls instead of stamps, besides other innovations, is about to go into commission, but will not take any custom ores for the next thirty days.—The rich Black Rose group at the head of Gillespie gulch is to be extensively worked during the winter.—On the Potter mine on Sugar Loaf the adit level to cut the main working shaft of the mine at a 120-foot depth, is being driven.—The Golden Chest mine, near the North Star property in the Sunset district, has opened up a fine looking body of yellow copper that runs from $75 to $100 a ton in copper and gold, including some silver. The strike was made in the bottom of the 150-foot shaft, and manager Semple is confident the ore body will improve rapidly, both in quantity and quality as development progresses.

Chaffee County.—Prof. W. J. Hatch has bought three mining claims on the Calumet branch of the Denver and Rio Grande from Oliver Spear.—In the bottom of the tunnel which is being driven on a vein on the east end of the Gold and Globe property by Denham and Ramsey, a strong vein of mineralized quartz is exposed.—Small quantities of rich ore came down in the recent cave-in at the Gold Bug at Turret, and were discovered in the cleaning up process which is now steadily going on.

Clear Creek County.—The Two American Sisters Mining, Milling and Development Company, has been making several shipments of smelting ore to Denver that returned from $100 to $150 a ton. The concentrating plant of the company is running steadily, saving almost all the values in silver, lead and zinc, and proving to be one of the most economical mills in the upper Clear Creek district.—The Dominio Mining and Milling Company is pushing the lower cross-cut on the Domino group on Payne's peak and will soon start a new cross-cut for the gaining of greater depth.—The Accord Mining and Milling Company has awarded a contract for driving the Mohawk tunnel several hundred feet.—A recent shipment of one carload from the Commonwealth vein on the Wilcox tunnel leased by the Crescent Mining and Leasing Company, brought average returns of $70 to the ton in silver and lead.—The vein opened up several weeks ago by Lensy and Nulph, on the Edinburgh on Republican mountain, has proven continuous for an increased depth of 145 feet from the old workings.—The Marshall-Russel tunnel, the portal of which is at Empire station, is to be pushed further into the mountain where, from surface indications, a number of rich lodes will be encountered.—A body of solid smelting ore, eighteen inches to two feet wide, was uncovered recently on the Tobin workings by Butler and Company.—Miller & Jacobs, leasing to the east of Butler & Company, are stoping on a two foot streak of good ore from which an initial shipment of one carload will soon be made.—As soon as the old workings of the Muscovite mine on Democrat mountain have been cleaned out and retimbered, the Muscovite Mining and Leasing Company will drive a cross-cut from the Moline workings to cut the Muscovite vein.—The Miller tunnel on Saxon mountain is now in a little over 600 feet and is expected to intersect a lode within a few feet.—The Honest John bore has been advanced for over 2,000 feet and is now in the heavily veined section of Highland Park and Saxon mountain.—A carload of smelting ore has been shipped from the Cram vein, intersected through the Doric tunnel, where stoping reveals a larger ore body and increased values in silver.—The Joplin tunnel has intersected the rich Gambetta vein, a big body of lead-zinc ore being uncovered at a depth of about 450 feet.—The Krupp Mining Company has advanced its adit on the Bellmont lode, situated on Saxon mountain, for 291 feet and considerable scattered mineral is showing in the breast, with a large body of quartz in evidence.

Gilpin County.—The Champion Mining and Milling Company in the Phoenix district is employing three shifts extending drifts on both sides of the Lone Star shaft at a depth of 260 feet, at the bottom of which is a four-foot crevice of yellow copper and peacock iron. Sinking will be carried several hundred feet deeper as soon as the drifts have been pushed to a safe distance.—With two shifts sinking under contract, the shaft on the Annie H. mine, belonging to the Elk Park Mining Company, is fast nearing the 200-foot point.—The Illinois Mining and Milling Company has a new shaft house in which a six by eight friction hoist and a forty horse-power boiler has been installed on its group of three claims in the Twelve Mile district, on which drifting from the main shaft at a depth of 100 feet, is being prosecuted on a copper and lead crevice, some of the ore assaying as high as fourteen and fifteen per cent. copper, besides gold and silver.—Ore from an eighteen inch streak in a five-foot vein, at the botom of the winze on the Copper Jim property up South Boulder creek, assayed $155.74 to the ton in gold and copper.—It is intended to have the new concentrator of the Evergreen Gold and Copper Company in the Pine creek district, in operation by February 1st.—As soon as connections are made by the Old Town and Newhouse tunnels, Managers Collins of the Newhouse will add fifty new cars to the rolling stock, to be of double capacity of the cars now in use in the tunnel.—During a recent week the Old Town shaft was sunk a distance of thirty feet in six drilling shifts.—In the 200-foot east level of the Nemeha mine on Bob hill owned by the Nemeha Gold Mining Company, there is a ten-inch streak of smelting ore, carrying ten ounces gold and twelve ounces silver, while in the 300-foot east level, the smelting streak measures sixteen inches wide and carries two ounces gold and 300 ounces silver.—A party of eighteen capitalists arrived on a special train at Black Hawk recently and inspected the property of the Fifty Mines Gold corpora-

tion.—Two shifts are working on the 170-footlevel of the Eldorado mine on Quartz hill.

Gunnison County.—The Hard Cash mine on Galena mountain will be worked extensively under the direction of Horace Miller, the original locator, and next spring a plant of modern machinery will be installed.—The Ethel Mining Company will soon begin the development of its claims near Box Canyon.—Emil Peterson has leased the Victor mine in the White Pine district to Denoon brothers.—A carload of ore is about to be shipped from the Buckeye Chief and Bonanza Queen by James Langill, leasing the property, and will run above $80 a ton.—The Raymond mill is operating steadily. The breast of the Raymond mine near Pitkin, is in over 2,200 feet and will probably be driven 1,000 feet more during the winter.—With the aid of modern machinery, lately installed, the Belzora-Bassick is driving two tunnels, one on each side of Ohio creek.—Shipments from the Grand Prize in Jones gulch average $100 per ton in carload lots.—Two feet of mill ore and six inches of high-grade show in the Gray Eagle mine with a development of 350 feet.—On the main tunnel of the Climax property owned by R. Williams, which is now in 825 feet a foot of $60 ore has been opened up.—The N. B. C. Company plans a vigorous winter campaign with its new plant of machinery.—The Ben Franklin, operated under lease by J. A. Grant, and one of the best properties in the lime belt, is being worked by a force of men on the winze level, having lately shipped two cars of ore.

Lake County.—The Manhattan Mining and Power Company in the Twin Lakes district has closed down its plant owing to the scarcity of water and has awarded a contract to the Hoffer brothers to drive the tunnel 200 feet by hand.—The Fidelity Mining Company has put in supplies and resumed work for the winter. J. Swaine of the Denver Smelter and Supply Company, has been appointed manager to fill the place of the late Thos. Henneberry.—Ore has been found in both the west and south drifts on the Mammoth, Leadville, and in an upraise which was driven from the 600 to the 500-foot level.—On Fryer hill those mines which are making direct shipment by the Colorado and Southern to the smelters include the Lee, Dunkin, Tip Top, Silver, Little Chief and McCrea.—On Carbonate hill the Waterloo, Morning and Evening Stars, Little Giant, Yankee Doodle and Little Nell are making daily shipments of iron, manganese and carbonates.—A large body of willemite or silicate of zinc has been discovered on the Hill Top property in the Horseshoe district.—The Tucson shaft is producing about 100 tons a day of fair grade lead-zinc sulphide.—It is reported that the Leo property, closed down some weeks ago, will soon resume.—The new mill of the Leadville District Company is now successfully treating the dump material of the Ibex that resisted the cyanide process first attempted.—Active development is progressing on the Alhambra placer on Rock hill where several bunches of mineral have been uncovered while drifting through the lime contact.

Mineral County.—The property of the Fisher Mountain Gold Mining and Exploration Company, located at Spar, in the Royal Arch mining district, and consisting of a tunnel right, known as the Judson tunnel, sixteen claims and valuable water power, has been sold to George F. Barclay, representing New York capital.—The Ridge mine and mill has an excellent supply of ore and the mill will begin a steady run.—A force of twenty men only is being employed on the Commodore mine, owing to the unfavorable metal market.—The Amethyst mill is treating ore with three shifts and good grade concentrates are being turned out.—The Humphrey tunnel has resumed operations.—The holdings of the Rio Grande Mining and Milling Company at Spar will be developed through the winter.

Ouray County.—During the past month forty tons of ore were shipped from the Newsboy, the high grade running $500 a car, net. Two stopes will be opened by the first of the month, while the level will be carried ahead as rapidly as possible.—The surface on the Free Gold group in Poughkeepsie gulch shows a streak of gold ore running several ounces to the ton, much of it in free gold. The tunnel to cut the vein at the seventy-five-foot depth has been driven a distance of 130 feet.—The Blowout tunnel of the Ouray Consolidated Mining Company was driven forty-seven feet by hand last month, four men in twenty-eight shifts doing the work.—J. P. Cassidy, owning a group of claims on Mount Hardin, southeast of Ohio Park, has uncovered an eight inch streak of silver ore averaging $100 to the ton, carrying besides values in gold and copper.—The Valkyrie Gold Mining and Leasing Company, a newly formed organization, has leased the Valkyrie group of claims in the Sneffels district for over three years for the sum of $60,000, and is working the property on a royalty basis of over ten per cent.—Leasers have shipped another car of ore from the Iron City group in Corkscrew gulch, the values being thirty per cent. copper and about fifteen ounces silver.—Twenty feet of drifting on vein No 8, in the San Pedro and Atlas companies show a rich streak of gray copper ore running high in silver, varying in width from one to fifteen inches.—The Southwestern Gold Mining Company will begin work on its property on Cascade mountain north of Ouray and will continue with a force of ten men during the winter.—E. Chapin Gard of Denver, has secured extensive interests in Poughkeepsie gulch for a syndicate he has formed to operate in Colorado, Utah and elsewhere.

Summit County.—The Sally Barber mine near Breckenridge, has resumed operations with a large body of zinc ore in sight.—In one of the stopes of the Gold Dust mine in the same district, which is being worked through a crosscut from the Washington shaft 138 feet in depth, a fine streak of lead has been encountered.—Manager Ed. P. Jones, of the Arctic mine, has placed an order for 40,000 feet of lumber and is negotiatng with several firms for machinery for a new mill to be erected.—The final cleanup has been made at the Banner placer with satisfactory results.—The first 100 tons milled by the Old Union mill in a ten days' run for the Wellington lead and zinc mine, yielded sixty-four per cent. lead, forty per cent. zinc and twenty to twenty-five per cent. middlings, that will require the magnetic process for separation. It is estimated that the exposed ore in the Wellington workings must run over $2,000,000 in value.—The Senator mine and mill up the Blue are being worked with regular shifts, the cavein being safely repaired and cleaned up.—Considerable prospecting and patenting are being done by old timers about Swandyke at the head of Swan river, where gold ore free from lead and zinc occurs in strong fissures. The King Solomon Mining Syndicate will commence the erection of an amalgamating plant as soon as the snow is off.—The claims of J. H. McAllister with a large body of $100 ore in sight, have been sold to the Colorado and Toledo Mining Company for $35,000.—The Cornucopia tunnel will be driven with a tunnel machine as soon as it is completed.—The Lenawee mill at Montezuma is to be enlarged and fitted with new appliances for saving zinc.—A good strike is reported on the property of E. D. Kellar and Sam Potter at Swandyke from which high grade ore is being sacked for market.—The new mill of the Montezuma Development Company is nearing completion. A large shipment has been made from

the prospect hole of J. F. O'Neil on Collier mountain.

Teller County.—Two large pumps have been installed at the Strong mine in Victor and to operate them thirty tons of coal will be required a day.—The Portland will also begin pumping at the same time as the Strong.—A right of way mining deed was given by William M. Bainbridge of the El Paso Company to the Cripple Creek Drainage and Tunnel Company to the Castello, Peck, Bernard Nos. 1 and 2, El Paso, the tunnel millsite and the Marr lode. The claims will be pierced by a big drainage bore.—A strike of gold ore running as high as $60 to the ton made at a very shallow depth, is reported on the Mayflower claim at the north end of the Gillet district.—A twenty-ton shipment of ore, expected to run about $200 to the ton in gold, has been made from the W. P. H. property on Ironclad hill, beng extracted from a vein at the 400-foot level.—From a three-foot vein Carper and associates, operating on the Pinto-Bison on Bull hill, are breaking $30 and $40 ore.—In October milling the extreme value of ore at the Vindicator plant was $20 a ton.—From a twelve day run at the Golden Cycle on 1,400 tons of ore, a gold retort worth $2,500 was cleaned up, the average value of the ore being $1.78 to the ton, which is the lowest grade of material ever handled in Colorado. The excellence of the mill, however, is demonstrated by the fact that even on this class a reasonable profit is realized.—The new mill of the Stratton Independence at Victor is being pushed up rapidly with day and night shifts at work.—The ore body opened by Mishey and Johnson on the Lilly claim of the Stratton estate on Gold hill has widened out to fourteen feet and grab samples ran as high as $80 to the ton in gold. A three-inch seam of almost solid sylvanite from which no assays have been made, has also been revealed in the development.—A fifteen-horse power electric hoist has been put in commission on the Prince Albert property on Beacon hill.—While drifting in an easterly direction on eighty-five feet from the shaft on the Cheyenne claim of the Isabella Company on Bull hill, Mayor Garretty of Altman, lessee, encountered a four-foot body at a depth of 110 feet, carrying values from two and a half to four and a half ounces in gold to the ton.—A car of $50 ore has been shipped by Young and Company, leasing on the Wilson of the Free Coinage group on Bull hill.—The Granite property on Battle mountain is producing fifteen carloads of ore a week.—A car of three-ounce ore broken from a two-foot vein at a point forty feet from the surface, was sent out recently by Reed and Company, leasing on the Maloney claim of the Isabella company.—The Union smelter of the United States Reduction Company at Florence, was opened for the treatment of ore on November 14th.

NEW MEXICO

Grant County.—The Bolton group of twenty-five claims parallel to Iron creek in the Burro mountains, owned jointly by Bolton, Higgins and Wilson, show carbonates on the surface ranging in streaks of from 100 to 300 feet wide and sulphides at a depth of from ten to fifty feet. Good fluxing material is at hand as also water and timber for a mill.—Nine carloads have been shipped from the Laura claim in the Steeple Rock district to the Shannon smelter and trial shipments will soon be made to Douglas in order to determine the best market for the ores.—On the Alabama claim in the vicinity of Carlisle a whim has been set up and extensive exploitation will be inaugurated on a wide vein carrying both high and low grade ores.—The Anson S. property has furnished its own fluxing material and has obtained for two years an average yield of seven and one-half per cent copper for every ton of crude ore treated including fluxes, lime and iron.—Twenty per cent. copper is being taken from a vein in the eighty-five foot depth of the Tip Top mine.—The National Bank Company, with a group of twelve claims in the Steeple Rock district, will install a fifty-ton cyanide plant in its ten-stamp mill.—On the Philadelphia copper mines at Hanover, which are producing sixty tons of eighteen per cent. copper weekly, a sixty-horse power boiler for a modern air compressor, and a forty-horse power boiler for the hoisting machine, which will have a depth capacity of 1,000 feet, will be installed.—The Colorado Fuel & Iron Company at Fierro, will install a new air compressor on the Jim Fair mine.

Santa Fe County.—It is stated that the mines of the Santa Fe Gold and Copper Company at San Pedro, will be opened up shortly with the majority of the miners engaged.

NEVADA

Churchill County.—Assays on ore cut eighty-five feet down in the shaft of the Pirouette Wonder Company in the extreme western part of the Wonder district, show the following values: Gold, $18.80; silver, 247.40 ounces or $148.44; total $167.24.—At a depth of thirty feet the vertical shaft on the Mizpah, Fairview, cut a shoot of ore on the foot wall and proved the vein to be twenty-four feet in width, the values being equally as rich as those encountered in the shallow surface cut.—The Grutt brothers of Rawhide have sent twelve sacks of gold bearing rock to the Hazen Reduction Works worth about $12,000.—Scott Butler, owning the Happy Hooligan group of claims in Rawhide, recently took some samples from a ledge that will reach about $15 a pound. The ledge is liberally sprinkled with free gold.—Excitement is at fever heat in Rawhide over a sensational strike made in the fifty-foot shaft on the Roseberry group bonded recently to Hays and Monnette of Goldfield, for the sum of $50,000. The gold is said to run as high as $125 a pound, occurring in the pure state covered partially with talc and in white porphry silicified as large as the first joint of the thumb and as heavy as a twenty dollar gold piece. The shaft is leased by Joe Alexander, Fred Hughes, George Andrews and Ed Keissling.

Elko County.—A Mexican opal bed has been found less than three miles north of Tuscarora, the capping of the bed being reported to extend for a mile. A shallow hole has been sunk and the matrix beneath the capping uncovered.

Esmeralda County.—At the Mohawk mine in Goldfield ore averaging $200 a ton was encountered on a winze sunk from the fifteen-foot level and the values increased so rapidly that at fifteen feet the shoot had run up to $900 a ton, extending across the bottom of the winze. The ore carries much free gold and the values are evenly distributed.—About 1,000 tons of ore, valued at $250,000, is awaiting shipment in the ore bins at the Little Florence, 100 tons a day being raised through the new double compartment shaft, mostly from the 400-foot level.—The Mohawk-Combination, with about two weeks to run, is turning out 300 tons a day of $70 ore, for the handling of which arrangements have been made with the Western Ore Purchasing Co.—As soon as the vein is picked up by the drift from the 500-foot level, which is expected to be done in about fifteen more feet, the Florence Mining and Leasing Company will sink its shaft to the 600-foot level.—When the 350-foot level is reached on the Simmerone lease crosscuts will be driven for the two big ledges encountered on the upper levels.—The Daisy Mining and Leasing Company is awaiting the arrival of pumps to handle the inflow of water in the lower workings.—The crosscut on the 250-foot level of the Plaza fraction of the Goldfield Mining and Leasing Company has tapped the Lord ledge at which it is aimed. Drifting on the 200-foot level is also

making good progress.—The St. Ives Leasing Company is, with two shifts, sinking its shaft at the rate of about three feet a day and ore from the 100-foot level is being stacked on the dumps.—The big stope from which so much ore was taken by Hays-Monnette, will be cut by a shaft and square-setted so that the ground will be perfectly safe as there is now danger of rock being loosened and coming down.—On a property opened up by Matt Skow, eighteen miles east of Battle Mountain and two miles east of the famous Dean mine, a strong vein five feet wide on the average has been proven in length by surface work for nearly a mile and show liberal quantities of free gold. Samples from a shaft fifteen feet deep reached from $80 to over $400 a ton in gold.—Three six-horse wagons have begun hauling $100 ore from the Lucky Strike mine at Battle Mountain to the railroad for shipment to the smelters.

Humboldt County.—H. Stewart, a well known prospector of Nome, Alaska, and Goldfield, states that the Gold Circle district in Squaw valley can show more extensive deposits of free gold and or larger value than those on the beach at Nome, and that experienced miners are needed in that part of Nevada.—The Midas, the principal strike in this section, is showing higher values than ever with continued development.—Extensive work is being done by McCauley and McCann on the Esmeralda group in the southern part of the district.—A night shift is working on the Cleopatra and Lookout groups and excellent results are showing.—Rich ore is revealed at little depth on the ground owned by Dunscomb and Geabbeart, four miles southeast of the main strike, and is being taken from a large ledge but lately located.—A second shipment of seven and one-half tons has arrived in Winnemucca from Goldbanks, being taken from Mohawk lease No. 5, operated by Gus Weymouth.—On the Blair at Goldbanks a 100-foot shaft is being sunk and will tap the ledge at the fifty and 100-foot levels.—Assays of ore taken from the ground of the Salt Lake and Nevada Exploration Company at Farrel, reached $598.70 in gold to the ton, from a nine-foot ledge. During the first two days of sinking $3,000 worth of ore was taken out and sacked for shipment.—Although the financial conditions have been somewhat of a damper, Seven Troughs is reported to be continuing operations with little abatement.—It is said that a ledge on the Kimball ground, Farrel, contains a streak on the hanging wall, thirteen inches in width, that will go over $3,000 a ton, and four inches on the hanging wall of the same grade. This ledge runs into the property of the Seven Troughs Contract Company for 3,500 feet.—J. R. Munn has secured a lease on the Durango and Disappointment groups in the Rosebud district north of the Sulphur road, which he originally located.—A carload of ore expected to reach $500 a ton has been shipped to the smelters from the Brown Palace mine at Rosebud.—Shipping of the same grade is also being done from the White Alps properties in that district.—Berry and Barrett have discovered a rich ledge lying south of the Rosebud postoffice and are instituting development.

Lander County.—On the Dudley, one mile south of Austin, a large body of ore, carrying picture values, has been encountered at a depth of sixty-five feet and has given considerable stimulus to the mining operators in this section. The property is under bond to Charles T. Olmstead of New York, the option running to April 1, 1908, and is being worked with double shifts in sinking and drifting on the ore bodies. A gasoline hoist has been installed.

Lincoln County.—The Prince Consolidated Mining and Smelting Company, recently organized with a capital of $2,000,000, has acquired the properties of the Phoenix Reduction Company, comprising the Prince and California groups in the Pioche district, where there is $3,000,000 worth of ore blocked out and ready for extraction, and 71,000 tons of lead-silver tailings, valued at the same sum, at the old mill and smelter town of Bullionville, where next year the company will erect a smelting plant.—About 1000 feet of retimbering has been done on an old shaft southwest of Pioche by the Ohio-Nevada Mining Company, which has taken over several other choice properties in the district.—A sidetrack has been graded from the round house to the depot site of the C. & P. railroad so that all freight for the Nevada-Utah Company can be easily transferred to their line.

Lyon County.—The Walkover Company at Ramsey, has two carloads of ore piled up on the dump and is putting up a hoist, having completed the upraise from the tunnel level. Three shifts will be soon put to work at the mine.—In the fourth level of the Rassey-Comstock mine, ore from a seven-foot ledge that will run close to $200 a ton in gold, is being broken down and sacked for shipment.—A vein three feet wide that will average $40 to the ton has been exposed on the Redlight claim, scene of one of the late strikes. Another excellent holding in the middle belt is the Cold Center claim, where at a depth of sixty feet the vein has widened out from eighteen inches to three feet, averaging $40 a ton with a part of the vein next the hanging wall, carrying values that will run into three figures.—The Gopher Hole claim on the Black Diamond claim, an extension of the ledge on the Ramsey-Queen, is proving constantly better with development.—On the Queen assays from a vein two or three feet wide reaches $3,500, this value being taken from the next hanging wall, while the rest of the vein averages between $300 and $400 a ton a ton.—Three distinct ledges are to be crosscut at depth by a tunnel on the Ramsey Bonanza.—High grade sulphide ore is being encountered at the 180-foot level of the property of the Ramsey-Ophir Company, which expects to soon to install machinery.—Over sixty feet of tunnel have been driven by the Gold Ridge Company, striking some high grade ore near the hanging wall of a big dyke.

Mono County.—J. B. Miller has made a cinnabar discovery on one of his claims four miles from Bodie, near Potato peak, carbonic acid gas being so strongly present in a seventeen-foot shaft as to prevent ignition of the fuse. Besides this, which is almost certain evidence of cinnabar or quicksilver deposits, experts visiting the property, have expressed themselves well pleased with it.

Nye County.—The discovery of rich ore at Silver Bow, fifty miles east of Goldfield, started claim jumping, which resulted in a meeting of the claim owners at which it was decided that anyone jumping claims in the future would be either hung or escorted across the desert, never to return.—The Shoshone mill is at present handling 125 tons of high grade ore daily and with the gradual increase of the working force, it will soon reach its full capacity. A big car of concentrates has been shipped that will run $400 a ton. It is reported that a battery of stamps will be installed to assist the rollers in crushing the ore.—The mill of the Sunnyside Mining Company at Round Mountain is unable to treat the full output of the mine, which is in high grade milling ore at the bottom of the main incline.—The Hydraulic Mining Company at Round Mountain has received seven carloads of twelve-inch pipe.—A six-foot forty-ton Huntington mill is to be erected at the Sphinx and the plans and specifications have been drawn. Excellent progress is reported on the winze started on the 110-foot level.—The Nisson stamps are all in place and the other machinery is all on the ground for the 150-ton mill being erected by the Johnnie Consolidated Company. A twelve-drill compressor and two engines, 100 horsepower and eighty horse-power, are be-

ing unloaded from the cars and will be installed by December 15th.—The fourth shipment has been made from the Catlin group in Silver Bow, consisting of tweuty-five tons of $150 ore, which will be the last of the winter. The shaft is now in $30 sulphide ore, suitable for milling.

White Pine County.—The Cumberland Ely Company has abandoned its option on six claims adjoining the Jupiter group, including the Challenge claim, and the Aurora group.—F. C. Williams, president and general manager of the St. Lawrence Mining Campany, and of the Adirondack Mining Company of Shoshone, states that the mines, which are located on a mountion near Mount Wheeler, are producing high grade ore, average assays running sixty to seventy ounces silver, and eighty per cent. lead. Concentrating ore goes fifteen ounces silver and twenty-five per cent. lead. Haff and Colwell, engineers of Ely, have surveyed ground for a tramway, one and one-quarter miles long, to a mill site where a 100-ton concentrating plant will be put up in the spring.—According to report, ten leasers are working on the Windsplitter claim at Blackhorse, owned by Will Hamilton, where a crew of miners while doing assessment work opened up an ore body near the surface, a two-pound sample of which tested at Osceola yielded $250 in gold for the one piece.—Young and Pepper as also Kiger and McQueen, pioneers of the Blackhorse district, are extracting rich gold ore for shipment but as there is a shortage of sacks it is allowed to remain on the dumps.—The Panguitch Gold Mining Company, composed of Utah capitalists, has encountered 100 feet from the mouth of its tunnel at Osceola, a two and one-half foot body of gold bearing ore which will assay $500 a ton. A portion of the force of ten men working on the property is engaged in sacking ore from the strike.

MEXICO

Aguascalientes.—Minas Tepezalanas y Anexas, the big copper mine, located in the Tepezala district and owned by the Guggenheim Exploration Company, which has been producing 3,000 tons of ore a month, has been shut down owing to the decline in copper, as have most of the copper mines in this section.

Chihuahua. — It is understood that the Encenillas Mines, Limited, will open the Santa Rosalia smelter on the first of December under the management of J. de Morambert and that it will install a concentrating mill in the Parral district for the treatment of low grade ores.—At the San Francisco del Oro mines, owned by an English company in the Parral district, 300,000 tons have been blocked out for half a mile along the vein and there will be 500,000 tons blocked out when the fourth level is reached. Much new machinery has been added and a fifty-ton experimental plant using Sulton-Steele dry concentrating tables is to be ready by December 1st.—G. S. Ashley, formerly head assayer of the Los Reina de Plata mines in the Santa Eulalia district, states that the report of a total shutdown of the mines in this district is absolutely without foundation.—About 20,000 tons of silver-lead ore are being shipped monthly from the Santa Eulalia camp, which will be increased to at least 30,000 tons when the new 800-ton smelter is in commission this month. — The Capuzaya Mining Company of Parral is being completely reorganized.

Coahuila.—The most famous coal mines in Mexico, those at Agujita and Rosita, are making improvements in machinery and apparatus for putting their product on the market.—La Cia. Mra. De Solidada struck a large and promising vein of zinc-silver sulphide in the Solidad mine at Monclova.

Durango.—The Penoles Mining Company of Mapimi is remodeling its smelter, the capacity of which will be increased from 1,500 tons to over 2,000 tons daily. From the mines 500 tons are being produced each day.—An English syndicate has shipped machinery to the Ventanas group of mines, where preparations for development on a large scale are being made.—The Mexico Smelter Company will blow in its oil fuel smelter at Pedricena in a short time, with an initial capacity of fifty tons a day.

Guanajuato.—Butters' slime plants will be installed at Pinguico, San Matis, and at the Guanajuato Reduction and Mines Company's works at Bustos.—A strike at the grass roots of 500 grams of silver and twenty grams gold ore has been made by Otto Durstewitz on his property near the ground of the American Mining and Milling Company in the La Luz district.—Superintendent H. W. Fischer of La Luz is making preparations to put up a seventy-five-ton mill to crush ore from the mines of the Mexican Mining Company, which has a good tonnage blocked out.

Guerrero.—J. B. Geighers, a mining engineer, and W. S. O'Brien, recently of Panama, have denounced 120 pertinencias of gold and copper ground, from which they state high assays have been taken, and propose the erection of a small mill on the property, which is near Balsas.—W. B. Grafton, representing a Mexican syndicate, denounced 120 pertinencias in the mountain range lying between the Zayoloapam and Balsas rivers, near the famous Reforma mine at the Campo Morado, and will drive a 100-meter tunnel to encounter the rich mineral zone believed to exist at that depth.

Oaxaca.—The Compania Minera y Anexas will carry on extensive development on its property in the Penoles district.—The 120 electric light plant of the Zavaleta mine, owned by the Pittsburg-Oaxaca Mining Company, is in service and the gauge of the 1,500-foot tramway has been widened so as to offer increased transportation facilities.

Sonora.—The Calumet and Sonora Company has begun shipping from its Catalena group to the El Paso smelter, the ore being a high grade silver-lead. About forty men working on the two shafts, 100 feet and sixty feet deep respectively, will block out about four carloads of ore a month.—The Dorotea group of five claims in the Magdalena district, on which about 300 feet of work has been done, have been sold by the Dorotea Mining Company to the Fay Cananea Copper Company, which will immediately develop the claims. The Yaqui Central Development Company has purchased the Llano Colorado, the Los Anigos and the Wright interest in the Los Angeles group in the Sonora mining district, east of Hermosillo, where it will put a force of men to work and erect a ten-stamp mill. The property is a gold and silver proposition.—Col. W. C. Greene while in Cananea announced that the resumption of the Greene-Cananea works hinges entirely upon the metal market, which he says will undoubtedly continue to be unstable for months to come.—A 500-ton all slime plant with a new system of agitation is being erected on the property of the Greene Gold-Silver Company at Concheno, which if satisfactory, will result in the improvements at Ocampa, Trinidad, Mulatos and other groups of the company.—At the Las Animas camp, eighteen miles east of Hermosillo, the Western Consolidated Mining Company has 300 pertinencias of good mining ground on which it proposes to install a modern hoisting engine and ten-drill air compressor, which are now on the ground. A 150-foot shaft has been sunk on a silver-lead ledge and drifting on the eighty-five-foot and 150-foot levels is under way, a four-foot ledge of good milling ore being struck at the eighty-five-foot level.—Development is being pushed steadily with a small force at the West Cananea.

SOUTH DAKOTA

Custer County.—Receivers being appointed for the property of the Westinghouse Electric and Manufacturing Company, it is intended that work will be continued. The new mica grinder has been installed at the New York mica mine and is in perfect running order.

Lawrence County.—It is understood that the Homestake company has acquired options to practically all the mineral ground lying between the Monarch property on the east and the Oro Hondo on the west, including almost everything of value in Strawberry and Grizzly gulches and at the head of Spruce gulch. The average price of the property sold is said to be $112 an acre.—In the lower tunnel on the property of the Globe Mining Company a rich vein of ore running from $12.50 to $25 in gold values, has been encountered 630 feet from the portal. A seven foot ledge of quartz rock, assaying $15 to the ton, was found between the porphyry strata in the east drift of the tunnel. It is intended to stope this down and by that means to open up the main ore body into the main tunnel.—The Arkota Company is carrying on the work of putting in place $6,000 worth of machinery, including a shaft house, twenty-four-foot gallows frame whim of 500-foot capacity, air compressor for two machines, fire tank and pump, steam pump and an engine of ample power to operate the plant.

Pennington County.—The Montana Mining Company which has resumed operations after a long period of little activity, has purchased 300 acres of ground adjoining its property on the south from Bert Heath of Rochford. The property is opened up with tunnels and shafts showing a good number of ledges and it will no doubt prove a valuable acquisition to the Montana Company.—James Cochran of Rochford, is preparing to develop his ground more extensively than formerly and has opened up three ledges, one seventy-five feet wide, one forty feet and one twelve feet.—When the boarding house at the Norfolk mine is finished a larger force of miners will be engaged and work will commence on the tunnel. A ledge has been opened showing fair values in gold and copper.—The Ivanhoe company has purchased the Radanda claim tangent to the Ivanhoe property. Grading for the new mill and cyanide plant is completed and the lumber is being turned out at a rapid rate. Another drill has been added and double day and night shifts are working in the mine.—A new saw mill has been purchased and will be put up at the Ideal mine as soon as it arrives.—The Great Western Machinery Company has received several orders from the Keystone district, one being for a new boist at the Eagle Mountain Copper property.—It is reported that bonds have been taken by the London syndicate on the Stanby and other properties near Rochford.—The Saginaw mill which was recently destroyed by fire, is being rapidly reconstructed and it is expected that operations will soon resume on the property.—The Yankton party of capitalists representing Henry Wagner of that city, have bought four valuable claims adjoining their property on the east and south, from Joe Bear. Active development is planned for the coming winter.—The Eldorado mine west of Keystone has a three-compartment shaft sunk to a depth of 206 feet on a wide vertical vein of high grade ore with 400 feet of drifting done. A consignment of ore recently treated through the Summit mill ran a trifle over $28 a ton.—Work has been suspended on the Dorothy and Pettigrew tunnels while the workmen are installing new machinery at other places, but after the first of the year operations will be started on a large scale.—The Teddy Bear Mining Company, recently organized, has 380 acres west of Rochford in the hornblende district, with several ledges of gold ore exposed, running from $6 to $8 a ton, besides an immense body of iron pyrites. A capacious boarding house and blacksmith shop are soon to be erected and as soon as the tunnel reaches a big quartz ledge 200 feet wide on the surface, which is now about fifty feet from the head of the workings, and the ore body is in conditions for easy and economical mining, a large mill will be put on a convenient site owned by the company.

The Marquis of Butte owns the finest private residence in the world, and the largest in Great Britain, which cost $10,000,000. Everything from a dining room to aquarium is to be seen there, and among other things three libraries, swimming and Turkish baths, aviaries, a billiard-room and a dining room which will accommodate 300 guests.

The introduction of electric in place of mule haulage in the workings of an English mine is reported to have not only reduced the cost of working but also to have rendered possible an increase in output of from 1,400 to 2,000 tons daily. Two fifteen-ton electric locomotives are in use, each provided with two motors, with controllers at either end.

Personal

R. H. Seibel of Chicago is making an examination of an iron property in the state of Jalisco, Mexico.

A. C. Carson, general manager of the property of the Butte Coalition Company, has returned to Butte from New York.

H. A. Shipman, consulting engineer of the United Mines Company, Rico, Colorado, is in New York on company business.

William S. Hutchinson of Hutchinson & Rice, New York, recently inspected copper properties in Pima, county, Arizona.

N. Z. Seitz, president and general manager of the San Felipe Mining Company of Etzalan, Mexico, is in Philadelphia on company business.

Walter J. Browning, general manager of the Mazapil Copper Company, has returned to Saltillo, Mexico, from an absence of several month in Europe.

C. N. Brady of Washington, Pennsylvania, president of the Capital Mining and Tunnel Company, recently visited the properties of the company near Georgetown, Colorado.

John Hays Hammond is now reported in California, looking after the Guggenheim interests. He has also other mining interests in view and will probably be in the Pacific coast states two or three months.

After residing five or six years in Europe, Nerver Y. Reed of Colorado Springs, has returned to make his permanent home in the city and state where he made a collossal fortune. In the last fifteen years Mr. Reed has been very successful in mining operations and his wealth is now reputed at several millions. He is optomistic over the business and financial outlook of this country, and says no ordinary calamity can check for any length of time the marvelous progress and development that has so firmly set in.

Dr. A. S. Russell of Duquesne, (Washington camp), Arizona, is spending a few week's vacation in Los Angeles. The doctor is a verp popular personage in his camp, and his many friends will be glad to see him return in better health than when he left. He is the miner's friend

Mr. Louis J. Bond, formerly of Denver, is manager for Calkins and Company's Appliances for Assayers, of Los Angeles, California. Mr. Bond has many friends and acquaintances in Denver and they will all be glad to know that he is traveling a successful road. He is building up a very big trade for his house and has made hosts of friends in Los Angeles and vicinity.

Coal Mining and Its Branches

Those Interested in the Coal Industry in the Rocky Mountains are Requested to send Mines and Mining Reliable Information on all Subjects of Interest to the Coal Trade

MILWAUKEE ROAD REACHES COAL MINES.

The Pacific coast extension of the Chicago, Milwaukee & St. Paul between Butte and Lavina, Montana, has been finished except for the Pipestone Pass tunnel through the Rocky mountains, and trains carrying fuel and building material are now operating. The Milwaukee has valuable coal lands at Roundup, a short distance from Lavina, and the building of the line to the mines was hastened so that fuel could be obtained. The Milwaukee is using the old line of the Montana railroad, which it purchased, between Lombard and Harlowton. At Miles City the track laying crews are working eastward to meet the men building westward from Mobridge, South Dakota. The engineers in charge of the work declare that within two months the line will be in operation from Mobridge, South Dakota, to Miles City, Montana. The gap between Miles City and Lavina will be shortened a great deal by that time, and if the conditions continue favorable this also will be finished.

VALUE OF HOLDINGS.

The London Statist expressed, in a recent issue, the opinion that "the experience of the Reading Company does not confirm the view that it is profitable for a railroad company to own collieries from which it draws its traffic."

This has raised a question in the East whether the coal mine properties, owned by the various railroads, are really good investments. This discussion is raised by the fact that the coal properties so far have really not paid a very large amount of money to the railroads considering the tremendous outlay. For instance, the Reading, and all other companies which own coal mines, have a large amount of money invested in undeveloped land. The time has not arrived yet for the operation of these properties and until that time does come the Reading, of course, will have a lot of idle capital invested in those properties which is not really bringing in any return.

The coal mines that are being operated so far have really not done much more than take care of their own fixed charges, paid their own dividends and reimbursed, in part, the companies for the expense to which they have gone in buying up these lands. Nevertheless the railroad companies have been very free to purchase the coal lands and their activity along that line has not come to an end by a great deal. In fact, one rather extravagant statement had it a short time ago, that the coal property owned by the Delaware & Hudson railroad was sufficient to give the stock a value of $1,000 per share instead of the $100 a share par value. It is evident therefore that the railroads consider these properties as having some value other than the exact return from the operation of the coal mines.

It is now generally admitted that the railroad companies, owning these coal lands, take into consideration more the fact that they afford a steady supply of tonnage to the railroad companies than that they return so much revenue. If the ownership of these coal lands were vested in any other than the railroad company the latter might possibly lose a part of the tonnage. Consequently the carriers have decided to purchase these properties even though they are not money makers in themselves, in order to get the traffic which they afford. This is one view of the case.

The other one is that the railroad companies have really not done so badly after all in the matter of getting net returns. A recent compilation of figures shows that the Reading Coal & Iron Company has shown a profit above operating expenses, improvements and fixed charges, equal to about four per cent. of the gross receipts. Since the award of the strike commission went into effect in April, 1902, this company has yielded in net profits to the Reading Company as follows: 1902, $2,362,636; 1903, $3,938,102; 1904, $4,542,204; 1905, $4,063,468; 1906, $3,160,604; 1907, $3,471,794. The Reading Company went into debt to the extent of $79,165,226 to the coal company at the time the latter properties were taken over. It is shrown by the returns for the fiscal year ended June 30th that net earnings of $1,583,814 was paid to the railroad company in liquidation, in part, of this debt, or being about two per cent. of the total indebtedness.

An annual payment of about $1,500,000 has been made by the coal company to the Reading Company since 1902. Prior to that time $880,000 per annum was taken out of the coal company and paid to the Reading Company for seven years. While the returns, therefore, may not have been entirely adequate it can hardly be said that the ownership of coal properties produced no profit. That the Reading, in transportation of anthracite coal has benefited largely by the advance in the price of coal and by the larger consumption of the commodity is shown by the fact that the coal company's earnings have increased but $1,109,158 from 1902 to 1907, while the gross earnings of that company have increased $12,228,032. This is because the operating expenses of the coal company, charged against the gross receipts, have not been reduced but have remained steadily at ninety-one per cent. of the gross receipts. Of the $1,109,158 gain in net earnings shown, $695,034 was taken up by increase in payments to the Reading Company and a balance of about $480,000 represents increased expenditures for improvements and extensions.—The Black Diamond.

ZINC INTERESTS TO COMBINE.

Chicago.—A new industrial combination intended ultimately to control the zinc milling and manufacturing business of the country, has been organized in Chicago by the consolidation of the leading mining interests of the Wisconsin and Missouri districts.

The holding company, capitalized at $20,000,000, will be known as the Consolidated Zinc Company. It is organized , according to its promoters, to put an end to ruinous competition of small producers and to regulate the output. Frank Nicholson, the largest individual operator in the Joplin district, is to be president and controlling spirit of the corporation.

A new industrial trust, which is intended ultimately to control the zinc milling and manufacturing business of the country, has just been organized in Chicago, by the consolidation of the leading mining interests of the Wisconsin and Missouri districts. The holding company, which is capitalized at $20,000,000, will be known as the Consolidated Zinc Company. It is organized, according to its promoters, to put an end to ruinous competition of small producers and to regulate the output. Frank Nicholson, the largest individual operator in the Joplin district, is to be president and controlling spirit of the corporation.

Obituary

George W. Rose, a prominent mining engineer of Guanajuato, Mexico, was murdered at his home in that city, September 11th, by burglars. It was a shocking and brutal affair, and the murderers were supposed to have been five men and three women, who were promply arrested and are now awaiting trial. Mr. Rose was one of the most able and popular mining engineers in Mexico.

William H. Hinman, for twenty-five years a resident of Colorado and widely known as the president of the Colorado Lime and Fluxing Company of this city, died at his home here of heart trouble, last week. His former home was Battle Creek, Michigan, where he was born in 1850. He leaves a valuable estate in Denver, which will revert to a sister, Mrs. H. W. Partridge of Detroit, where the remains were taken for burial.

James Lahey, a well known mining man of Bowerman, Gunnison county, was found dead in his cabin a few days ago. He is supposed to have died of heart trouble and apparently dropped off suddenly. Deceased was about sixty years of age, and had been a resident of Bowerman two years. The known surviving relatives are a sister in Denver and a brother somewhere in Kansas.

Ernest Dean Richmond, a prominent druggist of this city, died at his home 435 Cherokee street, last week of peritonitis and other complications. He was a highly competent pharmacist, born in New York April 6, 1863, and is survived by three brothers and a sister, residents of the East, and his wife, Mrs. Helen Richmond.

Another of Colorado pioneers renently pased away in the death of Samuel A. Hutchins of Denver. He had been prominently identified as a railroad contractor, with the building of some of the most important lines in the state. Deceased was born in Rochester, New York, in 1838, and came West in 1854, where he followed mining and freighting until 1868, when he began doing railroad contracting work for the Kansas Pacific, Denver & Rio Grande, South Park and other lines. The stone work through the Black canon of the Gunnison, which he built for the Denver & Rio Grande, was spoken of as one of the greatest engineering feats up to that time in this country. He leave a widow, seven sons and two daughters.

Charles Elliot Perkins, who died in Boston, Massachusetts, November 9th, had been president of the Burlington Railway Company for more than a quarter of a century. In fact he was the founder of the vast system, now extending into a dozen of the rapidly growing states of the Middle West, including Illinois, Wisconsin, Iowa, Minnesota, South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado, Missouri and other states, aggregating 10,000 miles and giving employment to 40,000 people. He was a man of marvelous executive ability and one of the foremost railroad men of the world. No man stood higher as a railroad builder of the Middle West. At the time of his death he was chairman of the executive committee of the vast Burlington system. President Perkins was admired for his sterling qualities and the grandeur of his manhood. His great heart beat in tender sympathy for the unfortunate in all the walks of life. Forty thousand people, of which he was the beloved leader, are bowed in grief, and the nation mourns the loss of one of her most distinguished citizens.

Peter A. Leyner, who died in Denver last week, was one of the sterling pioneers of Colorado. He settled in Boulder county with his family in 1860, where he resided for forty-seven years. Mr. Leyner was born in Backenheim, Rheinish Bavaria, in 1822, and came to America with his father's family in 1833, settling in Butler county, Ohio. He is survived by the widow, who was Marie A. Dock, whom he married in Columbiana, Ohio, in 1859. There are seven children, J. George Leyner, the noted machinery man of Denver, and president of the Leyner Engineering Works Company; Frank W. Leyner of Salem, Oregon; Mrs. Nora K. Hartman, wife of John H. Hartman, stockman of Kremmling, Grand county, Colorado; Mrs. Mattie M. Howell of Lafayette, Colorado; Mrs. Blanche L. Mackenzie, wife of T. S. Mackenzie, president National Paint Manufacturing Company of Denver; Charles P. Leyner of Boston, and Albert M. Leyner of Lafayette, Colorado. The children are all prominent in business and social affairs and were at the bedside when the father passed away. Mr. Leyner was buried near his old home in Boulder county.

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In fifteen years, from 1892 to 1906,, inclusive, the Indian returns show that silver valued at £135,541,035 was imported into Indian, while exports were £34,080,286. During that period, therefore, India absorbed silver to the amount of £101,460,749, an average of £6,746,050 per year.

MINE TIMBERING

By Wilbur E. Sanders, Bernard McDonald, Norman W. Parlee and others

Subjects treated—wood preservation, iron and steel supports, cross and longitudional sections, stoping, day walling, square sets, roof supports, framing, back centers, timber cutting tools, mine timber, framing machinery

PRICE, - - - - $2.00

MINES AND MINING 1824 Curtis Street, Denver, Colorado

THE STOCK AND METAL MARKETS

Colorado Springs

November 21.—Trading closed firm, but not very active. There is a steady demand for stocks in the mines list. Dante sold at 5, Dr. Jack Pot at 6, Elkton declined to 46 and Isabella sold at 20.

Following are the quotations:

Mines.

Stock.	Bid.
Acacia	05
C. C. Con.	03⅛
C. K. & N.	05
Dante	04¾
Dr. Jack Pot	06
Elkton	46
El Paso	30⅛
Fanny Rawlins	05
Gold Dollar	06
Gold Sovereign	03¾
Index	02
Isabella	19½
Jack Pot	03½
Last Dollar	02
Lexington	01
Mary Cashen	....
Mary McKinney	35
Mollie Gibson	....
Moon A.	10¼
Old Gold	03¼
Pharmacist	02½
Portland	90
Prince A.	....
Vindicator	75
Work	13½

Unlisted.

Stock.	Bid.
Golden Cycle	42
Jennie Sample	....
Jerry Johnson	05½
U. G. M.	04

Prospects.

Stock.	Bid.
Agnes	....
Alamo	003
Banner	....
Blue B.	02¼
Bob Lee	005
Buckhorn	0075
C. C. & M.	008
Coriolanus	....
Creede	....
Des Moines	006
Gold Bond	....
Hart	....
Gould	....
Ida May	....
Jolly Jane	0075
Keystone	....
Little Bessie	....
Little Nell	009
Little Puck	01
Mary Nevin	01½
Mt. Beauty	05
New Haven	006
Pilgrim	01
Princess	003
Raven	....
Republic	007
Requa S.	02¾
Robt. B.	....
Rose Maud	02
Rose Nicol	005
St. Thomas	01
Teutonic	....

Miscellaneous.

Stock.	Bid.
Anchor	001
Black Wonder	001
Blanche	003
Cable Con.	005
Colorado G. C.	003
Easter Bell	....
Favorite	001
Flower of West	006
Golden Age	....
Goldfield	....
Gold Hill	....
Goldstone	....
Grace	....
Greater G. B.	0025
Hayden	001
Hummer	004
Key West	001
Kimberly	....
Kitty	....
Lucrative	002
Marion	....
Matoa	006
Mariposa	003
Marquette	001
Missouri	005
Montreal	005
National	007
Nellie V.	003
O. K.	004
Olive Branch	002
Palace	....
Pinnacle	003
Pointer	....
Progress	003
Pythias	....
Red Spruce	002
Tenderfoot	004
Texas Girl	004
Uncle Sam	002
Volcano	....
Wide Awake	001

New York

November 22.—The situation in money matters is improving each day and ultimately will in a short time assume normal conditions. When the reaction sets in the demand for stocks will be tremendous.

Although a great many properties throughout the country have closed down temporarily, it is expected that they will soon resume operations, as the present supply of copper and other metals will only last for a short time.

The American Smelting & Refining Company, by reason of the money stringency, has largely suspended copper mining and smelting in both this country and Mexico. Its copper smelters in Mexico have been completely shut down, according to advices from that country. The reduction at the El Paso plant has been cut to the limit, as is the case with its Pacific Coast plants. Its Garfield smelter is only treating ores and concentrates absolutely necessary under contract, the principal product treated being the concentrates from the Utah Copper Company and the ores from the Boston Consolidated and Bingham & New Haven.

While copper has gone from 25 to 12 cents, lead has declined from 6 to 4¾ cents, and silver has declined from 70¾ cents to 62½ cents, and as the American Smelting & Refining Company is the largest producer of both lead and silver, this reduction in price has seriously affected earnings, not only because of the losses in smelting operations, but because mine owners restrict operations on a low metal market.

When normal conditions are resumed, business will be on a much safer basis. As it has been, finances have been carried on in a slipshod manner and the enthusiasm of industry had to a large extent taken the place of conservative trading.

Following are the quotations:

Stock.	Close.
Amalgamated Copper	46½
American Smelting	61¼
American Smelting, pfd.	83½
Colorado Fuel & Iron	16
Anaconda Copper	30½
Republic Steel	12⅞
National Lead	34¾
U. S. Steel	23
U. S. Steel, pfd.	80¼
General Electric	105

Curb.

*Stock.	Bid.
Arizona Commercial	8¾
Ahmeek	45
British Col. Copper	3¼
Black Mountain	4
Cumberland Ely	4¾
Davis-Daly	3¼
East Butte	4½
Giroux	3
Greene Cananea Copper	5¼
Keweenaw	5¼
Nevada Utah	2¼
Nevada Cons.	6⅝
Nipissing	5⅝
Superior & Pittsburg	8¾
Utah Apex	2½
B. & L.	....

*Otis & Hough.

Boston

November 22.—An official of one of the leading metal selling agencies says:

"I am not anticipating any great weakness in the position of copper. The foreigners demonstrated that they were willing to take an enormous volume of copper at 12 to 12½ cents, and this necessarily brought many of the American consumers into the market.

"Business with the consumers is not good and consumption has been materially cut down, bu the restriction in consumption does not equal the restriction in output.

"I figure that 13 cents will bring in considerable buying of the metal by American consumers who have no stocks of any size on hand, for the consumers will not forget that the metal selling agencies have no burdensome stocks now to carry and that they will not force copper on the market.

"There is a time coming when there will be a demand for two pounds of copper for every pound above ground. That time will depend largely upon the extent of the business depression. Opinions differ as to this."

Following are the quotations:

*Stocks.	Bid.
Adventure	87½
Arcadian	3
Allouez	23¼
Atlantic	8
Bingham	4⅞
Boston Con.	8¾
Balaklala	3
Butte Coalition	13
Calumet & Hecla	550
Calumet & Arizona	94
Centennial	20
Copper Range	50¼
Daly-West	10½
Franklin	6¾
Granby	....
Isle Royale	14½
La Salle	9
Massachusetts	2⅜
Michigan	8
Mohawk	44½
North Butte	35⅛
Old Dominion	21¾
Osceola	77
Parrot	9
Quincy	73
Shannon	9⅝
Tamarack	57
Trinity	10
U. S. Smelting	31¾
U. S. Smelting, pfd.	34½
Utah Con.	31½
Victoria	4
Winona	3¼
Wyandot	15
Wolverine	109

*Otis & Hough.

Nevada

(Furnished over the private wire of O. L. Malo & Co., 221-223 Boston building.)

San Francisco, Cal., Nov. 21.—Following were the closing quotations on mining stocks today:

Comstock.

Stock.	Bid.
Ophir	1.05
Mexican	38
Cons. Virginia	34
Savage	32
Hale & Norcross	41
Yellow Jacket	1.25
Belcher	17
Confidence	....
Sierra Nevada	31
Exchequer	....

Tonopah.

Stock.	Bid.
Tonopah of Nevada	7.50
Montana Tonopah	1.20
MacNamara	18
Midway	42
Tonopah Belmont	90
Tonopah North Star	08
Ohio Tonopah	02
West End Cons.	....
Rescue	04
Tonopah & California	....
Golden Anchor	06
Jim Butler	45
Cash Boy	02
Home	02
Monarch Pittsburg Ext.	....
Montana Midway Ext.	....
Golden Crown	03

Goldfield.

Stock.	Bid.
Sandstorm	20
Red Top	02
Columbia Mountain	15
Jumbo Extension	59
Vernal	07
Pennsylvania	....
Kendall	10
Booth	17
Blue Bull	15
Adams	06
Silver Pick	24
Nevada Boy	02
Black Butte Extension	04
Blue Bell	06
Dixie	03
Hibernia	03
St. Ives	36
Conqueror	04
Black Rock	02
Lone Star	09
Goldfield Wonder	....
Potlatch	....
Oro	09
Kendall Ext.	....
Sandstorm Ext.	....
Mayne	02
Atlanta	22
Great Bend	26
Simmerone	03
Empire	06
Red Top Extension	12
Florence	2.55
Diamondfield B. B. Cons.	15
Goldfield Daisy	74
Laguna	75
Commonwealth	....
Combination Fraction	85
Great Bend Extension	05
Great Bend Annex	03
Black Butte Bonanza	02
Kewanos	24
Esmeralda	....
Crackerjack	06
Red Hills	24
Mohawk Extension	....
Lou Dillon	04
Yellow Tiger	10
Grandma	06
Silver Pick Extension	02
Yellow Rose	....
Columbia Mountain Ext.	....
Diamondfield Triangle	07
Coming Nation	02

Bullfrog.

Stock.	Bid.
Original	03
Bullfrog Mining	04
Montana Bullfrog	01
National Bank	08
Lige Harris	....
Amethyst	08
Gold Bar	32
Steinway	....
Denver Bullfrog Annex	....
Bonnie Clare	....
Mayflower Cons.	15
Montgomery-Shoshone Ext.	03
Golden Sceptre	03
Montgomery Mountain	05
Bullfrog Diamondfield	....
Homestake Cons.	50
Yankee Girl	01
Nugget	....
Tramp Cons.	18

Manhattan.

Stock.	Bid.
Manhattan Cons.	28
Manhattan M. Co.	03
Gold Wedge	03
Seyler-Humphrey	03
Dexter	09
Little Joe	01
Crescent	....
Combination	02
Granny	....
Little Grey	....
Cowboy	....
Original Manhattan	05
Broncho	03
Jumping Jack	....
Pinenut	03
Buffalo	....
Stray Dog	12
Yellow Horse	02
Indian Camp	05

Other Districts.

Stock.	Bid.
Fairview Eagle	65
Nevada Hills	3.25
Pittsburg Silver Peak	1.00
North Star Wonder	....
Eagle's Nest	26
Alice of Wonder	....
Hailstone	07

Corporation Affairs and Finances

Call and Time Money.

Money on call loaned on the Stock Exchange on Monday as follows: Opened 10 per cent., high 10 per cent., low 5½ per cent., closed 6 per cent. Renewals at 10 per cent.

There was very little time money offered yesterday. A little was put out on a basis of ten per cent. for sixty days and 12 per cent. for ninety days, but it could scarcely be said that the banks had come into the market again, though they were in better evidence at the end of last week.

Commercial paper is still very dull. There has been a little buying of paper by out-of-town banks at 8 per cent. for the best names.

London—London discounts, 6⅞ per cent.; up ⅛ per cent.

Paris discounts 3¾ per cent.; off ¼ per cent.

Berlin discounts 7 per cent.; up ⅜ per cent.

United States Treasury.

Fiscal year 1907-8:

	Nov. 18.	This Month.
Receipts	$ 2,272,780	$26,818,177
Expenditures	1,910,000	21,020,000
Surplus	$ 362,780	$ 5,798,177

Fiscal year 1906-7:

Receipts	$ 2,054,695	$31,048,503
Expenditures	1,930,000	25,670,000
Surplus	$ 124,695	$ 5,378,503

	Nov. 18, '07.	Oct. 18, '07.
Available cash balance	$240,156,431	$237,097,154
Of which in banks	226,750,898	177,287,888

National bank notes received for current redemption: This day, $333,839; this month, $4,559,986; national bank notes awaiting redemption, $8,351,785; 5 per cent. redemption fund, $21,535,111.

Redemption of Short Fours.

Washington.—Four per cent. bonds:

Outstanding July 1, 1907	$36,121,450
Redeemed under circular of April 2d, previously reported	30,682,700
Redeemed Nov. 16th	64,950
Total	$30,747,650
Outstanding	$ 5,373,800

New York Sub-Treasury.

	Paid to Banks.	Received From Banks.
November 16	$ 3,627,000	$ 5,830,000
Since Friday	8,549,000	12,508,000

The Sub-Treasury was debtor at the Clearing House on Monday, $468,540. There were no important items. The banks have lost to the Sub-Treasury since Friday $3,959,000, and for the same period the Sub-Treasury was debtor at the Clearing House $645,684.

WESTINGHOUSE MACHINE CO.

Pittsburg.—A plan has been prepared, to be submitted to the creditors, to take the Westinghouse Machine Company out of the hands of receivers and place it in the hands of a creditors' committee, giving the company a reasonable time to pay its indebtedness. The debt is to be secured by bonds now in the treasury. Statements of the condition of the company show it to be in excellent shape to meet all its debts if given reasonable time. The business is large and profitable, and nothing but patience on the part of creditors is needed to put the company's affairs in good shape.

AMERICAN SMELTING & REFINING

The American Smelting & Refining Company has made the following announcement: "In the past we have adhered to a fixed schedule for pig lead which has only been changed at rare intervals, and of which the trade has been duly notified. From this time on we have decided to fix our prices according to market conditions."

UNITED STATES SMELTING.

Boston.—The following figures as to the prospective earnings of the United States Smelting, Refining & Mining Company for 1908, when the Real del Monte gets in operation, have been prepared by leading interests in the property. The figures are based on 12-cent copper:

Mammoth property 30,000,000 pounds (8 per cent. cost)	$1,200,000
Real del Monte	1,000,000
Centennial Eureka	750,000
Lead Smelters	480,000
Copper smelter at Bingham.	750,000
U. S. Smelting Co. and Richmond-Eureka	300,000
Smelter at Chrome, N. J...	125,000
Refinery	130,000
Total prospective earnings, 1908	$4,735,000
Preferred stock dividend requirements (7 per cent.)	1,644,000
Balance for common stock..	3,091,000
Equal to, per share	8.50

Net earnings the current current year should be in the neighborhood of $3,500,000 after meeting some rather severe losses in the custom smelting field.

The company has had but small benefit from the Real del Monte. Net earnings from that property this year will probably amount to about $250,000, but it is confidently expected that this big silver producer will earn $1,250,000 next year at the minimum, although in the above table the earnings are only placed at $1,000,000.

Likewise the Mammoth Company the coming year is expected to show earnings in excess of $1,200,000, as it is expected that the output will exceed 30,000,000 pounds now that its smelting plant capacity has been doubled, and that the cost will be nearer six cents, as the eight-cent cost this year has included many items of construction and development which will be eliminated next year.

OCTOBER COPPER PRODUCTION.

Boston.—The Boston News Bureau figures that during the month of October the production of copper in the United States, Mexico and Canada fell off 31,036.040 pounds, as compared with October, 1906, a drop of over thirty per cent.

Ten months of the present calendar year have now passed and the production of copper on the American continent has shown a decrease of 93,000,000 pounds. Of this decrease 83,000,000 pounds represents the falling off of Butte, a decrease of twenty-seven per cent. compared with the production in the same period in 1906.

This falling off in Montana production will probably enable Arizona to take first place this year, for while some restriction has taken place in that territory, the falling off from normal is only now about 5,000,000 pounds per month. Arizona mines, as a rule, are low-cost producers, and they were not obliged to shut down on a twelve-per cent copper market.

The Lake has not restricted much and its production for the ten months is about 10,000,000 pounds ahead of last year by reason of the operations of the Garfield smelter and the Utah Copper Company, although October production from Utah was about 2,500,000 pounds less than in September.

The total continental production for the first ten months of 1907 we estimate and compare as follows (in pounds):

	1907.	1906.
First six months	563,909,263	586,494,581
July	98,423,870	99,276,970
August	93,298,107	102,593,034
September	68,388,800	97,962,000
October	67,739,200	98,775,240
Total ten months	891,759,240	985,101,825

The falling off of over ten per cent. in copper output this year, where ordinarily production should have shown a ten per cent. increase should in time make itself felt.

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MINES AND MINING

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WEEKLY

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C. L. HALL.....Editor

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The President's Message

In his message delivered to the sixtieth Congress President Roosevelt deals chiefly with the great industrial questions that are pressing for solution in this country. The financial situation, currency reform, punishment of financial pirates, the tariff, capital and labor, compulsory arbitration, the railroad question, irrigation of the arid west, our inland water ways, public domain—timber, fuel, lands and a score of other interests that are vital to the people are handled with great ability, abounding in plain, practical common sense. He knows what we all know, that we have a great and grand country of incomparable resources, and that we are outstripping all other nations in material advancement—wealth, development, enterprise, public spirit, education and all the elements that combine to make a great people.

But with these marvelous advantages corruption has crept in like a thief in the night.

Scores of reforms, both state and national, are pressing to the front for settlement in the interest of the general welfare. Wealth breeds arrogance and corruption, and at that point, if not curbed, nations begin to decline. With our vast resources, educational opportunities, diversity of industrial interests, soil, climate, latent wealth and other great natural blessings, as a nation we should aim for the acme and continue upward and onward for a thousand years.

Some of the more important passages of the message that deeply concerns the West is the eight-hour day, the bureau of mines, the abolishment of oppressive monopolies, the great irrigation work, conserving the waters that run to waste, our land and timber interests and the public domain in general. Of the eight-hour day he says:

"The Congress should consider the extension of the eight-hour law. The constitutionality of the present law has recently been called into question and the Supreme Court has decided that the existing Legislation is unquestionably within the power of Congress. The principle of the eight-hour day should as rapidly and as far as practicable be extended to the entire work carried on by the government, and the present law should be amended to embrace contracts on those public works which the present wording of the act has been construed to exclude. The general introduction of the eight-hour day should be the goal toward which we should steadily tend."

In speaking of the bureau of mines he recommends the following:

"A bureau of mines should be created under the control and direction of the secretary of the interior, the bureau to have power to collect statistics and make investigations in all matters pertaining to mining and particularly to the accidents and dangers of the industry. If this cannot now be done, at least additional appropriations should be given the interior department to be used for the study of mining conditions, for the prevention of fraudulent mining schemes, for carrying on work of mapping the mining districts, for studying methods for minimizing the accidents and dangers in the industry; in short, to aid in all proper ways the development of the mining industry."

Of oppressive monopolies he speaks as follows:

"A combination should not be tolerated if it abuse the power acquired by combination to the public detriment. No corporation or association of any kind should be permitted to engage in foreign or interstate commerce that is formed for the purpose of, or whose operations create, a monopoly or general control of the production, sale or distribution of any one or more of the prime necessities of life or articles of general use and necessity.

"Such combinations are against the public; they violate the common law; the doors of the courts are closed to those who are parties to them, and I believe that Congress can close the channels of interstate commerce against them for its protection."

The Latest from London

The Anglo-Egyptian Financier, a journal published in London, declares, in rather strong language, that the tremendous upheaval which has demoralized the financial affairs of the United States, has naturally had its reflex to some extent in Europe,

causing the bank of England to raise its discount rate to 5½%, brought about by the heavy withdrawals of gold for the United States.

The only shipment of gold to Egypt during the early part of November was one of £465,000, but it is possible that a further sum may be dispatched within the next day or two, although it is not likely to be of any considerable dimensions. A few weeks back it was freely predicted that Egypt would be requiring four millions but there is no immediate indication of this being so, partly on account of the cotton crop being late, and more especially to the fact that large sums are being deposited in the Agricultural Bank on account of the land taxes and repayment from the fellaheen.

The stock market has been in a moribund condition ever since the recent crisis and the past month has been marked merely by stagnation and dwindling prices. Save for the transactions in bank shares, business has been of absolutely infinitesimal proportions and it is almost hopeless to anticipate any important revival until such time as the crops shall have been disposed of, and money begins to circulate freely again.

At the present time, however, there appears to be some recovery not only in money matters but in all departments of business. We look for the storm to blow over in the next thirty days and normal conditions to prevail.

A correspondent of the Anglo-Egyptian Mail takes an even more hopeful view of the situation in the Mussulman's country. Apart from the panic and unscrupulous speculation there is a large element of European business men in Egypt who steadily refuse to be tempted into the gambling schemes so prevalent in Europe and America. Again, nearly all the Mussulman world, protected by their tenets from speculation, remain unscathed, and their money is accumulating and is liquid. The bright side of the picture is bright indeed, for Egypt's sun is still rising; the shadows are there, naturally, but will shorten every hour. Then we shall have a clear field before us. The country was never more flourishing than today, the cotton crop is estimated at seven millions of cantars, and the price is higher than ever. The irrigation works contemplated and in contemplation are being carried out more actively than ever; in a word, all that produces and assures not only the prosperity but the steady progress of the wealth of Egypt, is as promising as ever. The era of real business is beginning; the tailors, wine merchants and hairdressers who left their proper business or neglected it to realize rapidly a large fortune on the stock exchange have either gone under or returned to the business they understood in order to gain their livelihood. Egypt has taken a particularly strong purge and directly the momentary weakness is over her health will be more perfect than ever. We are now in the stage of convalescene. The enormous fall in stocks and shares due mainly to over-speculation and to the stringency of money already referred to, has not, however, involved a parallel uneasiness in the land market.

Another Great Smelter For Colorado

It is understood the Rocky mountain smelter at Florence, that was built six years ago at a cost of $550,000, has been sold to the Troy Consolidated Mining Company of New York, for $400,000. The great plant has been idle for the past five years, and in fact, it never did run to do any good. It was a splendid plant with capacity of 500 tons in twenty-four hours and employing 250 men. Manager Johnson, its promoter and general manager, died before it was fully completed and following his death the great plant seemed to pine away and die. The original organization was styled the Rocky Mountain Smelting Company, and it finally fell into the hands of the Colorado Mining and Leasing Company through a defaulted judgement of $400,000.

The stockholders of the leasing company are to meet the 20th inst. to ratify the deal. If the Troy company takes hold of it the works will be reopened in the spring and there will be a great revival of business all around there. The new company has extensive mining interests at Kelbin, Arizona, and will ship its ores to the Florence plant in addition to treating custom ores from other parts of the country.

Sale of the Panama Bonds

The $50,000,000 worth of Panama bonds were snapped up before they were fairly out of the hands of the printers. One would think there was plenty of money in this country if the people would only keep it in circulation.

Secretary Cortelyou invited bids by a circular issued November 18th, which were opened on the 30th and were found to number more than 3,000, the loan having been over-subscribed by many millions, the average prices being considerably above the par value of the bonds. The aggregate amount bid, the number of bidders, and the price at which the bonds sold were a happy surprise to the government officials. To adjust and make the allotment satisfactory several days were required by a large clerical force.

Great Excitement About the Motto

The matter of leaving the motto, "In God We Trust," off our new gold coins, is very unpopular, and Congress will probably be asked to restore it or adopt a more suitable one.

Of course many people worship their gold more than they do their God, but that in no reason why the motto should make any difference to the one who may be so fortunate as to possess an innocent gold coin.

"In God We Trust" on our gold coins seems like sacrilege. It would be more appropriate in our homes, schools and houses of worship. The motto might be interpreted "In God We Trust" He will give us more gold.

Reports from Washington represent that petitions and letters are already pouring in urging Congress to restore the motto the first thing it does. The aim will be to secure legislation that will compel the secretary of the treasury to call in all coins that have the motto left off, recoin them with the motto on and pass a law that will make it permanent and irrevocable.

THE TALLEST CHIMNEY.

According to Power, September, 1907, the Eastman Kodak Company recently finished a brick chimney 366 feet high, nineteen feet and six inches inside diameter at the base and nine feet inside diameter at the top, lined throughout with a four-inch acid-proof lining, with a two-inch air space between the walls. The construction is of Custodis brick. This chimney is one foot higher than that of the Orford Copper Company at Constable Hook, New Jersey, and consequently is the highest in the United States, but will be greatly exceeded by the new chimney of the Boston & Montana Mining Company at Great Falls, Montana, which is now under construction.

Silicon and platinum give, by direct union, a silicide corresponding to the formula SiPt. This compound, which can be obtained crystallized, has chemical properties, somewhat like those of platinum, though more readily attacked by oxidizing agents.

A Brief Description of Washoe Smelter*

BY MEMBERS OF THE A. C. M. CO.'S STAFF

The Washoe smelter is situated about two miles east of the city of Anaconda. The smelter site includes about 240 acres and peculiarly adapts itself in topography to the efficient handling of material. By reason of its being on a hillside it is possible to make the level of delivery of the product of one building the level of the charge floor of the next succeeding one. (See diagramatic sketch—Fig. 2—showing the flow of material through the plant and the comparative elevations.)

The Ores.

The ore treated comes principally from the Butte district and is hauled by the Butte, Anaconda & Pacific Railway, a distance of twenty-eight miles, in trains of fifty 50-ton bottom dump cars to the railroad yards at East Anaconda. At this point these trains are split up according to their destination—that is, as to whether they go to the concentrator and sampling mill ore bins or to the storage bins. In each case they are made up into trains of eight or sixteen cars, according to the size of the engine to be used, and are carefully weighed before delivery to their respective bins.

Concentrator Bins.

The concentrator bins are of wood and steel construction and are divided as follows: Eight second class ore storage bins having a capacity of 1,250 tons each; thirteen sample ore bins of 200 tons capacity each, and one coal storage bin of 2,500 tons capacity.

Sampling Mill.

This building is of wood construction throughout and is 40x60 feet and six stories high. It consists of two complete sections, each section having a capacity of 1,800 tons in twenty-four hours.

The ore to be sampled is taken from the sample bins by an electric locomotive and dropped into bins feeding the crushers. The discharge of these crushers is elevated to the top of the building by means of bucket elevators. The stream of ore is cut four times by Brunton automatic samplers, cutting out one-fifth of the amount each time and discarding four-fifths—the final result being 3.2 pounds for each ton of ore crushed.

The discard from the sampling machines is elevated and dumped into concentrator ore bins, or if it is a first-class ore it is sent to the storage bins at the blast furnaces. The final sample is quartered by a Brunton quartering shovel, the resulting sample dried on a steam drier, ground in an Englehardt sample grinder, bucked so as to pass through a 100-mesh sieve and put up in three separate sample packages, one of which goes to the laboratory for analysis, one to the owner of the ore and one filed away for use in case of dispute.

*Anaconda Mining Co.

Concentrator Boiler House.

The concentrator boiler house is a brick and steel building, located behind the coal bins mentioned and furnishes steam to the concentrator power house. It is equipped with ten 300-H. P. Stirling boilers, necessary feed pumps, etc., and has an independent steel stack 14 feet in diameter and 160 feet high.

Concentrator Power House.

The concentrator power house, a brick and steel building, is located between the two concentrator buildings and is equipped with two 4-cylinder triple expansion condensing engines, each capable of developing 3,300 I. H. at 200 pounds steam pressure. The economical I. H. P. is 1,750, with 150 pounds steam pressure, at which they are run. There is also a four-cylinder triple expansion Fraser & Chalmers 1,150 I. H. P. engine, used as a spare. These engines furnish power to operate the mill and electric generators. The electric generators furnish power for the city and works lighting, street car system, small power circuits in the city, and all electric power required in the works for cranes, motors, etc. The steam power will be replaced in the near future by electric power from the power plant of the Missouri River Power Company, near Helena, Montana, and power from Flint Creek falls, twenty-two miles west of Anaconda—the steam plant remaining intact as a reserve.

Concentrator.

The concentrator consists of two steel and wood buildings, each being 255x350 feet and containing four complete sections, or eight in all. Each section is equipped with the same kind of machinery, and will handle 1,100 tons of ore in twenty-four hours. The equipment of one section is as follows:

1 12x24-inch Blake crusher.
2 7x10-inch Blake crushers.
6 Coarse concentrate Hartz jigs.
1 Set of 15x42-inch coarse rolls.
1 Set of 15x42-inch fine rolls.
36 Fine jigs (Evans patent).
1 Set of 15x42-inch middlings rolls.
18 Middlings jigs (Evans patent).
3 6-foot Huntington mills.
18 Fine finishing jigs (Evans patent).
33 Wilfley tables.

Besides a large number of classifiers, settling tanks, dewatering tanks, elevators and trommels of various sizes. A system of launders carries the concentrates to the settling tanks at the foot of the concentrator building.

The tank house is a frame building 70x670 feet and contains nine settling tanks for each section. These tanks are 19x19x15 feet high—each having a capacity of 420 tons of concentrates. These nine tanks are divided as follows: Six for the first settlement of the concentrates, and three for second settlement of the concentrates, or, in other words, for settling the overflow of the first settlement tanks; the overflow from the second settlement tanks goes to three large tanks common to all sections in that half of the mill—the overflow from these tanks going to the slum pond with the slum water from all the settling tanks and Wilfley tables. The concentrates caught in the first settlement tanks are called "fine concentrates;" those of the "second settlement concentrates," and those of the third settlement tanks are called "tank slum." The first two products are treated in the roaster building, the third at the briquette plant.

Slum Ponds.

The slum ponds are situated in the valley below the works. There are six ponds of different sizes, but averaging about 300x630 feet, and the slum water, containing the greater metal values coming from the concentrator, goes to these ponds for settlement. When a pond is full the water is diverted to an empty pond, and as much water drained off from the full pond as possible. The pond is then excavated by one of two Lidgerwood traveling cableways, each having a bucket capacity of five tons. The slum is piled outside the pond and allowed to drain and dry, and from these piles it is taken by cableway and dropped into a hopper on trucks, from which it runs into the railroad cars beneath and is taken to storage bins for use at the briquette plant. The slime water containing the least values is used for condensing purposes and for sluicing slag at the reverberatories and blast furnaces.

The settling tanks containing fine and second settlement concentrates are emptied from the bottom, after draining, into the cars of the local tramming system and transported to the charge floor of the calcine building—the material being weighed and sampled before dumping. It is the practice at this plant to weigh and sample the

material entering and leaving every building, so that an accurate check is kept on the work of each department.

Roaster Building.

This building is of steel construction throughout and is 96x412 feet. It contains sixty-four McDougal calcining furnaces of the Evans-Klepetko type. These furnaces have six hearths, 16 feet in diameter and are 18 feet high; they have revolving water-cooled shafts and arms, driven by suitable gearing from the top. The rabbles are so set as to move the material from circumference to center and vice versa, on alternate hearths until it finally drops into the calcine hoppers immediately over the tracks of the local tramming system for transportation to the charge floor of the reverberatory building. No fuel is used other than the sulphur in the concentrates, the burning of which furnishes sufficient heat to do the calcining, except on occasions when the furnace is not hot enough to ignite the sulphur, at which times fine coal is fed. The gases are taken through the brick flues into the large brick and steel dust chambers, where a large proportion of the flue dust is settled. This dust chamber is so arranged that the bottom is a series of hoppers, so that the entire contents of the dust chamber can be drawn out into the flue dust cars of the local tramming system and sent directly to the reverberatory furnaces for smelting.

The material which sticks to the rabble arms, center shaft, etc., called "barrings," is barred off and sent to the blast furnaces. Fine lime-rock and the screenings from first class ore in sufficient quantities to produce the slag desired in the reverberatories are charged with the fine concentrates through the feed hoppers of the roaster for the purpose of getting an intimate mixture. Each furnace is capable of handling forty-five tons of material in twenty-four hours.

Reverberatory Buildings.

This plant consists of two steel buildings each 183x225 feet, each containing four coal-fired furnaces the hearth dimensions of which are 19 feet in width and from 102 to 116 feet in length, with a grate area of 8x16 feet and a smelting capacity of 300 tons per twenty-four hours, on natural draft.

The fuel used is Diamondville coal, shipped from the various mines in Wyoming, owned by the Washoe Copper Company. The coal is dumped into hoppers that have four points of discharge directly over the fire-box. It is the custom here to charge the furnaces from the first two hoppers next to the bridge-wall of the furnace and to use charges weighing about fifteen tons.

The flame, after leaving the furnace, passes through two 375-H. P. Stirling boilers, in tandem, which reduces the temperature of gases going to the main flue to about 600 degrees F. By this means 600 B. H. P. are obtained from each furnace from the waste heat. The ashes and partially burned coal that drop from the firebox fall into a stream of water which carries them over a grizzly, the larger pieces of ash going to the slag sluice, the smaller, containing coke and unburnt coal, being sluiced to the coke jigging plant, where the coke and coal are jigged out and the ashes sent to the dump. The coal and coke recovered are elevated to a bin from which they are taken to the briquette plant by the local tramming system and there become a constituent part of the briquettes, thus obtaining a fuel value from an otherwise waste product. By this means ten per cent. of the reverberatory fuel is recovered.

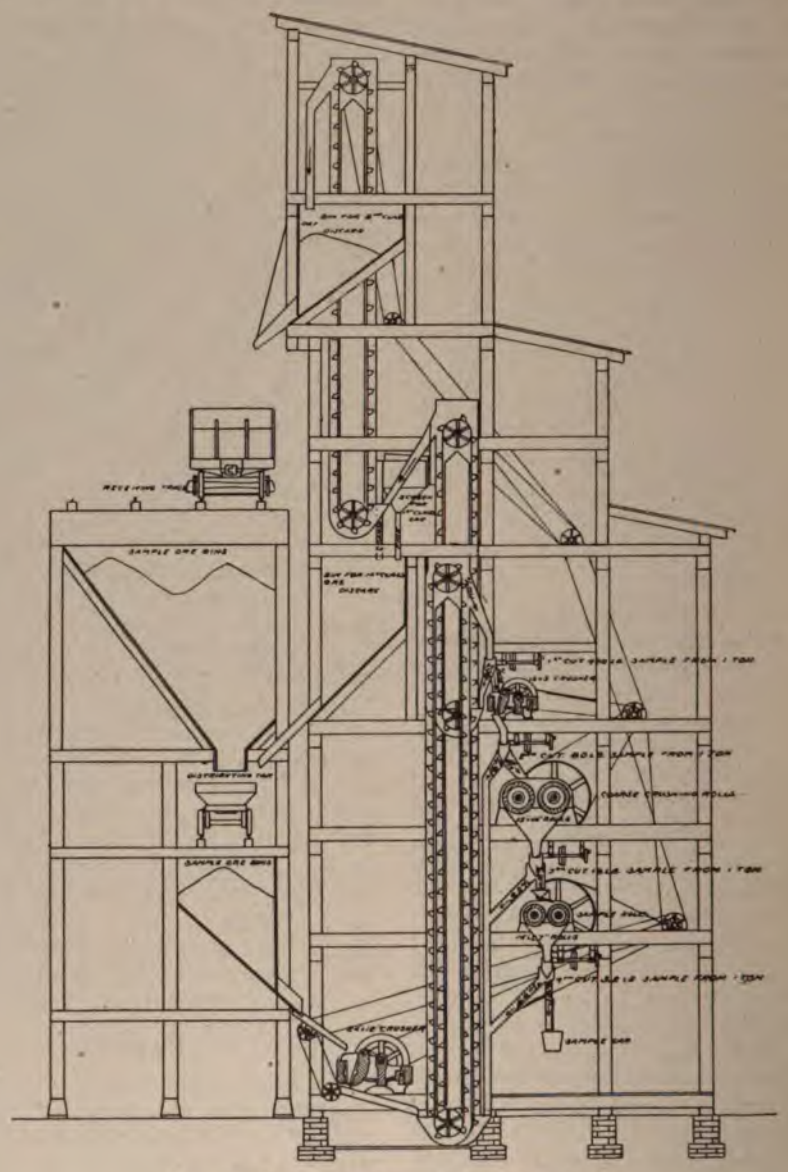

Fig. 3—Cross Section of Sampling Mill.

The slag is skimmed from the reverberatories twice in eight hours; it is allowed to accumulate until its depth is from three to four inches above the skimming plate in the front of the furnace and then skimmed into a stream of slum water, which granulates and sluices it through a cast-iron lined launder to the slag dump. By allowing the slag to accumulate in the furnace in this manner it is possible to skim the furnace very rapidly—as much as sixty tons of slag being removed in twenty minutes. By this method the actual use of a rabble to "pull" the slag is avoided, the rabble being used to keep the "bay" clear of floating pieces of unfused silica and to prevent the flow from being more rapid than the water can handle properly.

The matte is kept down some distance below the skimming plate, making it impossible to "pull" out any of the matte, thus avoiding explosions. The matte is tapped from the side of the furnace, through copper tap-hole

pizes, and running through the cast-iron launders, lined with silicious material, to hot metal ladles of ten-ton capacity and taken by the local tramway to the converters. The brick used in these reverberatories are manufactured by the brick department of the Anaconda Copper Mining Company, which is located in Anaconda. They have given the greatest satisfaction. The silica brick of that portion of the roof immediately over the fire-box (and for a distance of thirty feet from the fire-box) lasting nine months and over. The remaining parts of the roofs are still in good shape, having been in operation for two years. The brick are 15x6x3 inches. It is the practice to clay or fettle the bridge-wall and sides when needed every thirty days. The bridge-wall plate is kept cool by a circulation of air by a pipe connection with the main flue. The utilization of the waste heat as a steam

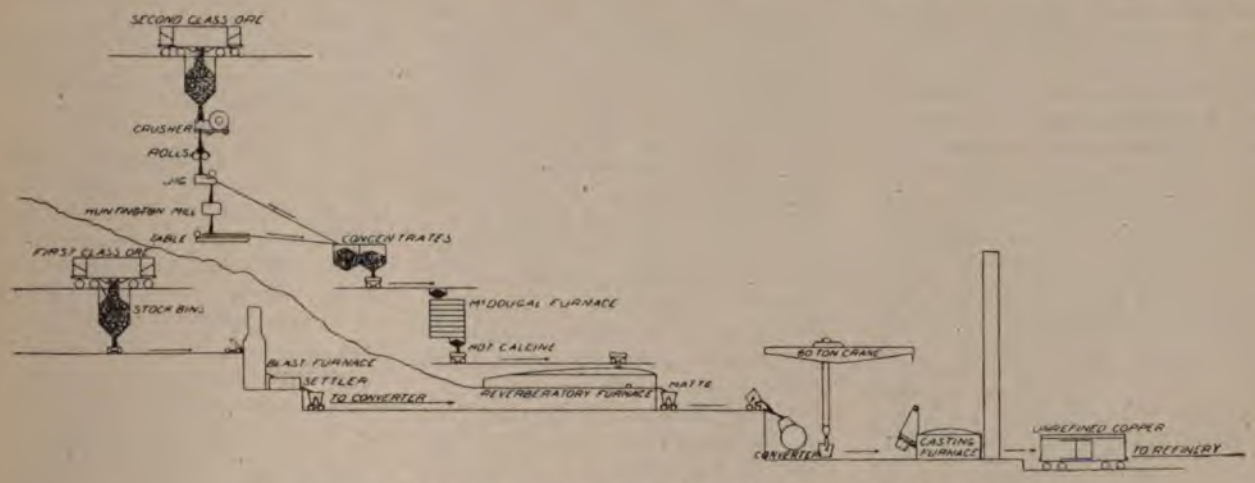

Fig. 2—Diagram Showing Flow of Material Through Plant.

producer and the saving of the coke from the ashes made a decided reduction in the cost of reverberatory smelting.

Briquette Plant.

The briquette plant is a frame building 55x192 feet, containing four Chambers Bros. end-cut, auger-type brick machines—each machine having a capacity of 700 tons of briquettes in twenty-four hours. The briquettes are made of fine concentrates, fine first class ore, pond slum, and fine coke from the reverberatory ashes. These materials are conveyed from the storage bins by belt conveyors to a pug-mill, from which they discharge into the brick machine proper, where they are further mixed and forced through a former by the auger of the machine in a continuous bar. This bar is cut into briquettes, weighing about ten pounds, by a revolving cutter peculiar to this type of machine. The briquettes are conveyed by a series of belt conveyors to storage hoppers, from which they are loaded into blast furnace charge cars as part of the charge.

The blast furnace building is of steel construction 82x269 feet and contains three furnaces—two of which are 51 feet long and the other 87 feet long—having a width of 56 inches at the tuyeres. The smaller furnaces have a capacity of 1,600 tons, the larger 3,000 tons of charge in twenty-four hours. The small furnace is two jackets high and has the crucibles water-jacketed. There are two points of discharge.

The bottom of the center of the furnace is of silica brick, laid on water-cooled cast-iron plates, mounted on cast-iron columns and has a gradual slope to each discharge spot. The 87-foot furnace has three discharge spouts and three settlers, but is otherwise built in the same manner at the 51-foot furnace. The 51-foot furnace has eighty-eight 4-inch tuyeres, and the 87-foot furnace has 150.

The type of furnace used is the Mathewson patent blast furnace. It is very successful in operation and much easier to handle than the old style furnaces. Its advantages are: That it has increased hearth area with but two ends to bind and hold the crusts. Any crusts forming on the sides can be readily gotten rid of by allowing the furnace to run down, the crust either dropping or being readily barred. It has smaller radiating surface for the same hearth area than the smaller furnaces, uses less coke, makes a flexible unit—as any part of the furnace can be handled as the case demands, and is susceptible to repairs without shutting down the entire furnace. Leaking water jackets may be replaced without shutting down the furnace, thereby saving considerable time. It takes from six to eight hours to change a jacket. The procedure is to shut off the tuyeres on the jacket to be changed and the one opposite, allowing the water to circulate until all buckstays, tuyere pipes, etc., are removed, and the jacket ready to be pulled out; this chills a wall inside the jacket strong enough to hold the contents of the furnace. The new jacket is placed in position, all connections made and the blast turned on and the smelting resumed—and during all this time (extending over ten days or two weeks) the other half of the furnace was in operation.

The circulation of the water through the jackets is as follows: Each individual tier of jackets forms a complete set with two feed pipes and two discharge pipes. In the case of the tier at the crucible end, the feed enters the crucible jacket, the discharge from this going to the one immediately above, the discharge of this to the top jacket—from which it overflows to the waste pipe. The 51-foot furnace has three 7-foot 45-degree unlined steel flues; the 87-foot has five. All the flues discharge into a large brick and steel dust chamber of the type adopted for the entire plant and described under "Roaster Plant." The dust chamber is connected by a large flue to the main flue, which will be described further on.

The furnaces are charged from both sides, the doors being raised by compressed air. A "charge train" consists of eighteen cars operated by the local tramming system. The cars receive the weighed quantities of the various materials from the storage bins adjacent to the blast furnace building. These bins are in three rows and are built of wood. Each row is 28 feet wide 786 feet in length and 20 feet deep, and divided into a series of bins of various sizes as required by the volume of material handled. They act as storage for first class ore, coarse concentrates, lime rock, coal for reverber-

atory and power house, slum for briquetting, converter lining, etc., and are filled from the B., A. & P. tracks on top of the bins. All gates in these bins that are used constantly are operated by compressed air. The charge train first takes its quota of slag, then ore, then coarse concentrates, then lime rock—then goes to the briquetting plant, where it receives its quota of briquettes. Two charge cars constitute a charge, the weight of which varies from 8,400 pounds to 11,000 pounds, according to its composition. The train when loaded is hauled to the blast furnace building, where the cars are dumped by compressed air lifts.

The slag and matte flow from the furnace through the discharge spouts into the 16-foot settlers, previously mentioned. The settlers are circular and made of half-inch steel plates lined with 12-inch silica brick. The slag overflows and is granulated by slum water from the concentrator and is carried off in launders lined with cast-iron to the dump. The matte is tapped from the settler into the ten-ton hot metal ladles of the local tramming system and taken to the converter plant while still molten.

Converter Building.

The converter building, including the converter lining plant, casting furnaces and converters is 176x416 feet and is constructed of steel, except the crushing and mixing department of the converter lining plant, which is of wood. In the converter building proper there are eleven converter stands. The converters used are the horizontal barrel type, 8 feet in diameter and 12 feet 6 inches long, and are operated hydraulically. The building is equipped with two 60-ton electric traveling cranes—one for the handling of converters when they are in need of replacement and for other work in connection with the lining department—and the other for handling slag and copper from the converters. There are also two 15-ton electric cranes in the casting department for general use.

The matte is brought from both blast furnace and reverberatory buildings to the charge floor of the converter building, which is 23 feet above the operating floor. The matte is poured from the ladle into a launder, the end section of which is pivoted so that it can be turned out of the way when the converter is filled. The converter is filled in a nearly vertical position with the air blast on. Seven tons of matte per charge is used whether the converter is freshly lined or not and the charge is finished to blister copper on the same converter.

The slag from the converters is poured into unlined steel ladles and taken by the crane to a casting machine of the platform conveyor type, having pressed steel molds. This slag ladle is placed in a hydraulic cradle from which the slag is poured into the molds, chilled by sprays of water and conveyed to a steel bin outside of the building, from which it is loaded into railroad cars and transferred to the storage bins for blast furnace use.

The blister copper is poured into a sheet steel clay-lined ladle and taken by the crane to a hydraulic cradle from which it is poured into the casting furnace.

Converter Lining.

The converters are lined in the main converter building, but the lining material is prepared in a building 40x62 feet on the southwest corner of the converter building. The lining material is highly silicious ore, having gold and silver values, and pond slum is used as a "binder." The material is crushed by a Blake crusher and fine rolls, sized by trommels and sent to the bins, which feed four Carlin 7-foot grinding and mixing pans. Here it is ground and mixed with pond slum to the proper consistency and then transferred to the converter, where it is tamped around a steel form by a special Ingersoll-Sergeant tamping machine, 5-inch diameter and 20-inch stroke. This tamping machine is supported by a revolving jib crane, the vertical motion of which is controlled hydraulically. After lining, the converter is removed to the drying stand by the crane, where it is dried with coal and scrap wood from all over the plant, especially from the concentrator and sampling mill.

Refining and Casting.

There are three casting furnaces, two having a capacity of 95 tons and one 110-tons; two of these are in operation all the time. The copper is poured in at the side and as soon as the furnace contains fifty or sixty tons, the oxidation by 90-pound air pressure is commenced. When the furnace is full, the slag is removed and oxidation is completed; it is then "poled" back to the desired pitch and cast. The casting machine is a platform conveyer with the molds attached and operated hydraulically. The molten copper is run into a suspended ladle, from which it is poured hydraulically into the mold on the machine. When a mold is full the ladle is dropped to a horizontal position and the conveyor is moved so as to bring the next mold into position, and the process is repeated. This machine is chilled by a spray and when "set" is dumped from the mold onto a platform conveyer, operating through a tank of water, then trucked to scales, weighed and shipped to eastern refineries.

Smelter Power House.

The smelter power house is a brick and steel building 85x526 feet and contains the various engines, compressors, blowers and auxiliaries necessary to produce the various pressures of air required.

In this building there are six Connersville and four Roots blowers, direct-connected to Corliss engines and each having a capacity of 300 cubic feet per revolution, compressing to forty ounces 360,000,000 cubic feet of free air in twenty-four hours for blast furnace use. There are six 16-pound air compressors, compressing about 60,000,000 cubic feet of free air in twenty-four hours for converter use. Three 90-pound air compressors for general use, such as shop tools, air gates, raising blast furnace doors, dumping blast furnace charge cars, tamping converters, etc. Four 900-pound air compressors for the air locomotives of the local tramming system. Four hydraulic pressure pumps and accumulators, pumping water up to 360 pounds for use in hydraulic apparatus at converter plant, and all the necessary auxiliaries, such as gravity condensers, dry vacuum pumps, feed-water heaters, boiler feed-pumps, etc. The steam for these engines is supplied from the waste heat boilers at the reverberatory building and from twelve Stirling boilers in a boiler room bricked off from the power house. The latter will be largely replaced by electric power in the near future.

Local Tramming System.

The equipment of the local tramming system consists of seventeen of the H. K. Porter & Co.'s air locomotives, weighing 12½ to 22 tons each, and 240 cars of various kinds. The locomotives operate with 900-pound air pressure in the receivers, which is reduced by means of reducing valves to 150 pounds for use in the cylinders.

There are forty-eight miles of standard-gauge track in the works.

This department handles about 13,000 tons of material each twenty-four hours. The charging stations are placed at convenient points throughout the works and are fed by an extensive piping system. The locomotives are charged about every twenty minutes—this varies according to the nature of the work—it takes about two minutes to charge.

Flues and Stacks.

There is an elaborate flue arrangement, especially noted for its immense size. The three principal flues, viz., the blast, roaster and reverberatory, are 20 feet wide and 15 feet high and of brick and steel construction. The con-

verter flue consists of two 7x7-foot flues. The blast, roaster and converter flues connect with their respective dust chambers; the reverberatory flue with the furnace direct. The flues are of the following lengths:

	Feet.
Blast	1,653
Roaster	488
Converter	703
Reverberatory	842

These flues all merge into one main flue. For the first 1,200 feet this flue is 60 feet wide; side walls 20 feet high; the bottom being excavated at an angle of 30 degrees from the horizontal. The roof is of I-beam and brick arch construction. The remaining distance to the stack is 1,122 feet of 120-foot flue.

This portion of the flue has a roof of No. 9 sheet steel. The stack is 300 feet high with an inside diameter of 30 feet. The top of this stack is 932 feet above the surrounding valley.

The flue dust is drawn off through hoppers spaced every ten feet in the tunnel into cars operated by the gravity system from a set of drums placed immediately behind the stack. When the cars are loaded they are sent to the lower end of the main flue and elevated to the adjacent flue dust bins. There are two sets of bins here—one for the flue dust containing the desired per centage of arsenic for the arsenic plant—the other for flue dust to go directly to the reverberatories.

Arsenic Plant.

The flue dust intended for the arsenic plant is conveyed from the bins by inclined revolving pipes into the feed hoppers of two Brunton revolving hearth roasting furnaces. The arsenic fumes from these are conducted through 240 feet of zigzag flue, cooling off the gases from which sublimes the arsenic, giving a product of about ninety per cent As_2O_3. When a sufficient quantity is produced the roasting furnaces are shut down, and this product handled by wheel barrows to a small reverberatory refining furnace, fired by coke, and re-sublimed in a similar zigzag flue, thus getting a product of 99.80 per cent As_2O_3, which is then ground and barreled for shipment.

All residues from the roasting furnaces are transported by the local tramming system to the reverberatory furnaces for smelting.

Change House.

For the convenience of the men there is provided a brick change house 55x97 feet, containing 1,528 lockers, steam heated and ventilated by an independent set of flues to the outside air. Hot and cold water is provided, as well as shower baths. In this building there is an emergency hospital, with a trained nurse in attendance, who gives first aid to the injured and attends to the minor cases of injury. For serious cases a modern ambulance is available to take the patients to the hospital in the city.

Foundry and Shops.

The different shops, such as the carpenter, machine, boiler, blacksmith, pipe and electric, are all equipped with the tools and machinery necessary for repair work; the new work and heavy repair work being done at the foundry and machine shop, operated by the A. C. M. Company for the mines and smelters, as well as custom work. This establishment is located on the outskirts of Anaconda.

Laboratory Sampling Mill.

All the metallurgical samples taken throughout the works are sent to the laboratory sampling mill (which is a brick building 29x63 feet), and there prepared for the chemical laboratory.

About 9,000 samples of all kinds of material in process of treatment are prepared each month.

Laboratory.

This is a large brick and stone building of two stories, fitted with all the necessary appliances for the making of chemical analyses of the ores, and also for assaying. All samples are taken in the works and at the sampling mill are sent to this department and there analyzed for such elements as copper, gold, silver, iron, lime, silica, alumina, zinc and sulphur. There are 15,000 actual determinations made each month.

In the basement of the laboratory there are quarters provided for the testing and photographic departments. In the former there are the recording instruments of a branch station of the United States weather bureau, connected electrically with the station about a mile distant on the top of a hill to the south of the big stack.

General Office Building.

This building contains the offices for the manager, assistant superintendents, chief clerks, accounting department, engineering department and timekeepers; also a modern telephone exchange connecting all departments of the works and numerous outside points such as Butte, Helena, Great Falls, etc.

A private telegraph wire connects the office with the Western Union and Postal Telegraph Companies in Anaconda.

The storage system for winter supply consists of two lakes—Storm lake and Silver lake. These are natural lakes, supplemented by dams to increase the volume. Storm lake receives its water from its natural drainage area; Silver lake is filled from its drainage area as well as receiving its greatest supply from the overflow, in the spring, of two lakes known as Twin lakes.

In the winter time a certain amount of water is pumped out of the Silver lake storage to supplement the water coming from the creek below. This lake is fifteen miles west of Anaconda at an altitude of 6,480 feet, or about 1,100 feet higher than Anaconda. The water from both creeks and lakes is gathered by a dam about four miles west of the city and diverted into a 5x7-foot flume, seven miles long, that carries it to the works.

Some idea of the magnitude of the works may be obtained from the following figures:

	In 24 Hrs. tons
Amount of ore that can be treated in 24 hours	10,000
Lime rock from adjacent quarries	2,300
Coke used	650
Coal for Reverberatory use	500
Coal for Power use	500

Water, per minute, 35,000 gallons.
Men employed in and around Anaconda, 3,000.
Monthly payroll for above, $300,000

A RIFLED PIPE LINE FOR CONVEYING OIL.

Contract has been let by the Southern Pacific Company for the building of a rifled oil-pipe line, 256 miles long, from oil properties in Kern county, in California, to tidewater on San Francisco bay. A feature of the line is the character of the pipe used, its rifled construction being a radical departure from that of the lines now in use for conveying oil. Spiral indentations made in the rolling of the pipe constitute the rifling.

A series of experiments has demonstrated that, after a small proportion of water has been added to the oil, and the necessary pressure applied, the whole will develop a whirling motion, and that the water, being heavier, will seek the outside of the pipe, threrby enveloping the oil in a thin film or shell of water; this shell or film of water acting as a lubricant between the oil and the pipe, greatly reducing the friction and allowing the core of oil to glide through the pipe readily.

Throughout the length of 256 miles of pipe there will be twenty-three pumping stations, the equipment of each station being in duplicate, so that in the event of a breakage of any part of the machinery of one pump the other may immediately be put into service.

With the size of the pipe, which is eight inches diameter, the nigh pressure carried and other improved facilities, a rapid transmission of oil has been shown to be possible, and it is estimated that at least 23,000 barrels of fuel oil can be delivered every twenty-four hours.

The Occurrence of Oil in South Africa*

By JAMES SNODGRASS, F. G. S.

The probability of finding petroleum in South Africa in payable quantities has interested many capitalists, and considerable sums of money have been expended in examining various properties where indications have been found. The prospect is a tempting one as the value of such a product exceeds, in case of success, probably that of any other venture in the history of mining. Encouragement has been found in the fact that small amounts of oil have been discovered in many localities in Cape Colony and Orange River Colony. I have had occasion to examine several of these properties and have also obtained particulars of many more, but hitherto the results of all ventures have been negative as far as discovering oil in quantity goes. The indications, I believe, have all been associated with the Karroo formation, as was to be expected. There is, however, another characteristic of the indications, viz.: that the occurrences have been either in or close to dolerite dykes, generally in these dykes. Some recent investigations which I have made seem to me to throw some light on the cause of the presence of the crude oil in these dykes, and may assist investigators in forming opinions as to the value or otherwise of the indications. I have found in all cases the small amounts of oil either in cracks or seams in the dolerite which have been filled up with calcite or silica, or in cavities sometimes containing also a little calcite. The seams vary in thickness from mere films to several inches and the cavities up to half an inch in diameter. Recently I have obtained samples of dolerite from strata lying conformably with shales, and evidently contemporaneous. These layers of dolerite were from one foot to eighteen inches thick. The effects of the original heated conditions of the rock were evident in the shales immediately in contact with it and underneath, but one foot distant there was no evidence of heating. In testing, I found that the shales in contact with the dolerite gave no oil on destructive distillation, while those a little distant contained carbonaceous matter which yielded oil. The evidence here shows that the oil in the dolerite has been derived from the shales by distillation, due to the heat of the rock when in a molten condition. It is known that such rocks when first formed by volcanic action, are often porous, the porosity being caused by steam expanding on the reduction of pressure. The subsequent cooling results in the condensation of the steam and the formation of a partial vacuum, and the oil formed from the shales is then sucked into the cavities. In process of time the rock becomes solid through the gradual deposition of calcite, and the oil is thus locked up and preserved.

Similar reasoning applies to the oil locked up in seams. These seams are due to the shrinking of the dolerite in cooling, and the oil has probably entered them with the water that has deposited the calcite or silica. It is worth notice that I have found the occurrence of oil in cavities is always associated with thin layers of dolerite, while the seams or cracks containing oil are in dyke masses. The conclusion to be drawn from the foregoing is that prospectors or investors should be chary of putting any weight on indications associated with dolerite or other volcanic rocks. If these rocks intrude through carbonaceous shales, even if very poor, they will certainly at the time of their formation distil some oil from the shales, some of which is preserved in the manner detailed above. The indications, therefore, are not to be taken as evidence of the presence of petroleum in quantity. A further point may be mentioned. No confidence is to be placed in the occurrence of payable amounts of oil in districts much intersected by dykes of igneous rocks. The breaking up of the strata by these dykes would prevent the accumulation of oil. So far as I have yet learned, the only real indications of petroleum in South Africa seem to be found at Inhambane.

*African Mining Journal.

Profits in Low-Grade Ore

A writer of the South African mines in speaking of the low-grade ores of the Witwatersrand says "for the first six months of the year the gold mines of that district have earned an aggregate profit of £4,700,000. Companies for which detailed returns are available have netted £4,659,000, and the Vogelstruis Estate and the Orion Mines, together with one or two small producers, may be calculated to bring the full total up to approximately £4,700,000. In 1906 a total of £8,220,000 was earned, and at the rate of earning for the first six months the 1907 total may be anticipated at £9,400,000. For the last four months working costs in respect of sixty-three companies have been under 22s per ton, the expenditure per unit during June being 21s 6d, and the profit being at the rate of 12s 4d per ton. Last year the cost of expenditure worked out at 22s 5½d per ton, the profit being at the rate of 12s 1d per ton. A study of aggregate profits together with costs and profits on a per ton milled basis shows that, whilst working costs have been reduced by about one shilling per ton during the past year; the revenue per ton has also fallen by practically the same amount. This is the common history of Witwatersrand mining, and in the future this particular phase is likely to be brought into much greater prominence than hitherto. Each reduction in the cost of operation brings a certain number of tons into the zone of payability, and whilst the mines are today dealing with ore worth just under 34s per ton, it is not unreasonable to think that before very long 30s will be the value of a Rand ton. If the present rate of profit-earning is to be maintained, working costs, it will be seen, must be brought down to about 17s 6d. The relation of the cost of operation to the productive value of the Rand is a fascinating but highly intricate problem. It is extremely difficult even to approximate the additional amount of pay-ore which a reduction of, say, 4s per ton in the cost of working means to the Rand, but it is certainly enormous. In the earlier days of the Rand small mills and more expensive stores necessitated the working of richer ore than heretofore, but the days of very high costs and 12 dwt ore are over. An instructive view of Rand mining economics may be obtained by estimating the cost of winning a sovereign's worth of gold. Today it is costing 12s 9½d; just previous to the war it was about 12s 6d. Despite the fact, then, that working costs per ton have been very appreciably reduced since the 1899 days, the expenses entailed in winning a sovereign's worth of gold are higher today than in the period preceding the war. The obvious deduction is that the grade of ore milled has decreased more than working costs.

Of the sixty-two companies which declared profits in June, just fifty per cent, earned less than 10s per ton. The Robinson, which is an exceptional proposition, earned £65,050, or 40s 2d per ton. Important mines like the Witwatersrand, which made £14,752, the Rose Deep with £13,100, and the Geldenhuis Deep with £14,050, each earned less than 10s per ton. These facts serve to emphasize the importance of fully realizing that the Rand is a low-grade field, and that in the deeper level future companies earning profits at the rate of under half a sovereign per ton will account for the greater part of the Rand's earnings.

Notes on Antimony Smelting*

The object of these notes is to describe the plant and the processes now actually employed at a smelter in Mayenne, France, for the production of antimony metal and oxides from stibnite ore. The ore comes in two classes: Rich, carrying fifty to sixty per cent antimony; and poor, consisting of quartz impregnated with stibnite, and carrying ten to twenty per cent metal. Only the rich ore is used for the recovery of metal, the poor being burned for the manufacture of oxides.

The prevalent method of antimony smelting, as practiced elsewhere, involves five steps: Liquation of the stibnite by simple fusion; oxidation of the crushed sulphide by roasting; reduction of the oxide with coal, to yield crude metal; refining by fusion with soda; treatment of volatile oxide caught escaping from the oxidation roast. This process is tedious, and requires an excessive amount of labor, especially during the oxidizing roast, when the mass must be thoroughly rabbled so as to break the oxide crusts and permit complete desulphurization.

A much shorter process is employed at the smelter under discussion, and, although it has been criticized as being incapable of yielding pure metal, it does actually operate to entire satisfaction. It involves only two steps; Fusion with scrap iron to produce crude metal; followed by a refining fusion, yielding metal with only 0.5 to 0.8 per cent of impurities.

First Fusion.

The reverberatory furnace used in the first operation, Fig. 1, has a total length of 8 or 9 m., width of 1.25 m., and height of 1.6 to 1.7 m. from hearth to roof. It comprises fire-box, A, hearth, B, and dust chambers, C, D and E; the utility of these chambers is questionable, since but little oxide is caught in them, at their prevailing high temperature.

Assuming the furnace empty, the process is begun by heating the hearth and charging a mixture of fusible slags and Solvay-process soda. A charge of the rich ore, mixed with enough soda to give a quick fusion, is then added, and the whole is stirred until melted. Silicious and other impurities form a slag which is skimmed off and thrown away.

When the surface of the bath is clear, scrap iron, usually in the form of detinned cans from which the lead solder also has been carefully removed, is added and stirred in, after which the door is closed and the temperature raised. The metalic antimony, robbed of its sulphur, settles underneath; the concurrently formed iron sulphide floats on top. This process is repeated until the level of the bath is raised conveniently near to the working door. The furnace is now ready for continuous operation.

As soon as each addition of iron has undergone reaction the layer of iron sulphide is ladled off in an iron pot, care being taken not to dip too deeply, and poured into molds. The furnace is then allowed to regain its heat, when the crude metallic antimony is ladled out in the same way and cast into molds; between 300 and 350 kg. of metal are removed each time. This cycle of operations—introduction of ore, with stirring; skimming of slag; addition of iron, with stirring; pouring of iron sulphide; pouring of crude antimony—occupies about three hours. The usual life of a well-built hearth, working at this rate, is five to six months. The weights of the materials put into this furnace at each charge are about as follows: Crude ore in lumps, 450 kg.; washed fine ore, 150 kg.; slag from second fusion, 20 kg.; soda, 20 kg.; iron scraps, 240 kg.

The crude antimony, the principle impurity of which is iron, has a crystalline fracture. If the working of the charge in the hearth is not thorough, the crude metal may carry as much as four or five per cent of iron, and will show a finely crystalline fracture. If the furnace work is done with care, the metal will carry not more than one or two per cent of iron, and its fracture will be exceedingly coarse. A representative sample of crude antimony shows the composition: Fe, 2.75; S, 1.95; As, 0.54; Pb, 0.22; SiO_2, 0.12; Sb (by difference), 94.42 per cent.

Both of the waste products of this first fusion carry antimony, and at present no attempt is made to save it. The slags should not carry over one or two per cent antimony. The amount of antimony carried off in the iron sulphide occasionally reaches ten or twelve per cent, averaging six or seven per cent. It occurs here in the sulphide state, or as globules of metal, the latter proving that the furnace was not sufficiently hot to permit clean separation. It would be a simple matter to crush the iron sulphide and then recover the metallic antimony, inclosing in it, by a jigging process.

The refining operation is done in a furnace like the first, but smaller. The crude metal is re-melted, taking care to avoid oxidation by covering the bath with a thin layer of fusible slag, composed mainly of soda. The melted bath is kept for a while at a brisk heat, to allow the impurities to rise, after which the door is opened and the impure oxides are skimmed. The workman judges the progress of the refining by pouring little ingots from time to time, carefully covered with slag; the end is denoted by a fern-leaf crystallization of the surface of the ingot. Before drawing off the refined metal, a protective covering is thrown over the bath, composed of antimony oxide (the unmarketable portion of the oxide furnace product), oxy-sulphides, soda, and a little coal. The antimony is then ladled out in iron pots, and cast in rectangular molds holding twenty to twenty-one kg. of metal. A small portion of the protective material is taken out of the furnace and put into each mold, before the metal, so as to give a bright, crystalline surface to the ingot. This is supposed to advance its market price, but is not an accurate index to its purity. Analyses of two samples of such antimony are given:

	I	II
Sulphur	0.069	0.075
Iron	0.190	0.070
Lead	trace	0.081
Arsenic	0.265	trace
Silica	trace	0.008
Antimony	99.450	99.690
	99.974	99.924

As a rule, three charges are put through the refining furnace in twenty-four hours. The slags from this process frequently carry as much as twenty per cent of antimony, and are put back into the first treatment as noted above.

Efficiency of the Process.

The amount of antimony put into the first furnace, at one charge, is about as follows, in kilograms:

Lump ore, 450 kg. at 55% Sb	247.5
Fine ore, 150 kg. at 45% Sb	67.5
Slag, 20 kg. at 20% Sb	4.0
Total antimony in charge	319.0

From the 2,552 kg. of antimony thus put into the furnace in eight charges, about 2,350 kg. of crude metal is obtained, a loss of 7.93 per cent. At ninety-five per cent pure, this contains 2,232 kg. antimony, from which after refining, about 2,127 kg. of pure metal is obtained, a loss of 4.71 per cent. The actual efficiency of the process is thus 83.3 per cent, but some antimony is introduced in the oxides used in the refining furnace. Disre-

*Chimie Industrielle.

garding this factor, the efficiency would be about seventy-nine or eighty per cent.

Double-Hearth Furnace.

It has been found possible to combine two hearths in a single furnace, the crude metal being reduced on one hearth, then, while still melted, transferred to and refined on the other. The individual processes are carried out exactly as already described for separate furnaces. A gas burning jet was once tried in a double furnace of this sort, but its excessive heat ruined the structure.

Oxide Manufacture.

The apparatus for converting the low-grade ore into anatomy oxide consists of a furnace, condensing chambers, and a chimney equipped with an upward projecting steam jet to provide draft.

The furnace consists of an inclined grate composed of square bars, A, Fig. 2. The ore is charged in at B; the oxides pass out at C, and the burnt ore is raked out through the bars at the bottom. The condensing chambers D, E, and F, are castiron pipes, with V-elbows at the top and bottom. A sliding plate G in each bottom elbow allows the condensed oxides to be removed. The series of condensers passes at N into the bottom of the chimney H.

A coke fire is started in the furnace; on this is spread a layer of ore in lumps of first size, then more coke, another layer of ore, and so on. The air reaching the furnace is ample to oxidize the ore, the residue averaging not more than one to three per cent. of antimony.

The product of the first condensers is rendered a gray color by admixture of coke dust, and contains oxides of iron and arsenic; it is nevertheless merchantable. The middle condensers yield a white oxide, analyizing ninety to ninety-two per cent. Sb_2O_3. In the chimney, the steam from the jet, J, condenses and moistens the remaining oxides, which run down the shaft and are collected periodically by decanting from the vessels, K and L. This oxide, after drying, is either sold or used in the antimony refining process, as described above.

The best white product will average about as follows: H_2O, 0.75; Sb_2O_3, 91.30; Fe_2O_3, 1:15; As_2O_3, 5.25; SiO_2, 1.60 per cent. The arsenious acid, which always accompanies the antimony oxide, is the more volatile of the two, hence is found in greater abundance toward the chimney, as shown by the following determinations of arsenious acid present: Gray oxide, 4.52; white oxide, 5.25; wet oxide, 6.46 per cent.

The output of these oxide furnaces is not wholly satisfactory, owing to losses during charging, while the condensation of oxide also is far from perfect. The plant under discussion has four such furnaces, which are served by two men.

Mining Industry in Alaska in 1907

A. H. Brooks, chief of the United States Geological Survey's division of Alaskan mineral resources, has just returned from Alaska and reports that various unfortunate conditions have led to such a curtailment of gold mining in Alaska during the last summer as to result in a very material reduction in the gold output as compared with that of the previous year. Accurate statistics will not be available for several months, but the preliminary estimates indicate that the value of Alaska's entire gold production for 1907 will be between $17,000,000 and $18,000,000, as against more than $21,000,000 last year. This loss must be charged for the most part to the decrease in the production of the placer mines.

It is not to be supposed, however, that Alaska's placers have passed the zenith of their production. According to Mr. Brooks all the evidence points to the conclusion that a greater annual production than that of 1907 will yet be attained. The mining industry has therefore received only a temporary setback, but it is one from which it may not recover in less than a year or two.

Mr. Brooks says:

The curtailment of placer operations can be assigned definite causes, of which the difficulty of obtaining adequate labor is the most important. The Fairbanks district is the one that suffered most from labor troubles. A strike was started there on April 27th, just when the gravel accumulated by the winter mining operations was ready to be sluiced by use of the water of the spring freshets. As a result many of the winter dumps were not finally washed out until fall. This not only prevented the mine operators from continuing work, but also put many of the smaller operators into financial difficulties, because they had counted on the winter production to finance the work during the summer. Labor conditions in the camp gradually adjusted themselves during the summer, but throughout the open season there was lack of experienced miners. When the strike began about 1,200 men, it is said, left Fairbanks, most of whom started for the newly discovered Innoko district. As a result very few new enterprises were begun and many of the established mines were not operated during the summer. Had there been laborers enough the Fairbanks district would no doubt have produced more gold in 1907 than it did in 1906. As a matter of fact its production was probably $3,000,000 less than it was in the previous summer.

Among last summer's important developments were the noteworthy production of Esther creek, the opening up of considerable placer ground on Vault creek, and the discovery of prospects on Eldorado and Our creeks. These discoveries, together with those on Smallwood creek, indicate that the Fairbanks districts property is more extensive than had been previously supposed. The finding of gold in an adjacent area, on the upper Chena river, is also significant, as this region appears to lie in the same general belt as the Fairbanks district.

The railroad from Fairbanks has now been extended to the mouth of Cleary creek, and this road and the numerous wagon roads that have been built make all parts of the district accessible. The high charges on freight from Puget Sound ports and the uncertainties and delays in its delivery still greatly discourage all mining enterprises. These discouragements can be removed only by the establishment of railroad communication with some coastal point.

Important developments were made in the Rampart district, notably in its southern part, on the tributaries of Baker creek, where two ditches were built and some successful hydraulic operations were carried on. Noteworthy, too, is the installation of three dredges in the Fortymile district. Two of these were in operation for a part of the season.

Some excitement was caused by the discovery of placer gold at several points on the lower Yukon. While no great values were found, yet these localities are so accessible that they give promise of being mined at relatively low cost. The two largest stampedes of the season took place to the Chandlar river and to the Innoko. In the first locality at least one producing creek was developed and some good prospects were found at other localities. Of the Innoko less definite information is available. More than a thousand people took part in this stampede, and many claims were staked, but little systematic prospecting was done. The region is rather difficult of access, being several hundred miles from the Yukon by the Innoko river route. Some gold has been found, but

Mining Letters from Correspondents

Mines and Mining Wishes to Secure an Actual Reputable Correspondent from the Mining Centers of the World

Bisbee, Arizona

Nov. 30.—The past week in the Bisbee district gave no news of great importance to the mining world. Although nearly all the properties in the district are doing more or less development work, no strikes of great impartance have been made, although some good ore has been uncovered in the Superior and Pittsburg and Calumet and Arizona properties.

The Copper Queen development work is being carried out in all the company's properties. At the Gardner, Spray and Czar the output has been the same as during the rest of the month. The Holbrook shaft is undergoing improvements to the surface buildings and shaft. At the smelter in Douglas nothing of any note has ocurred during the past week.

On the Calumet & Arizona development work is still being vigorously prosecuted at both the Irish Mag and Oliver shafts of this company. Some of the drifts are still in the high grade ore recently encountered. The smelter in Douglas has three of its five furnaces in operation.

The Superior & Pittsburg company is still producing a fair quantity of ore, shipments averaging between 500 and 550 tons per day. The Hoatson shaft still continues in good ore in the 1,200-foot level, and some high grade is being shipped to the Douglas smelter. At the Cole shaft another strike has been made which adds to the value of the ore being shipped. Sinking for the 1,300-foot station still continues. The Briggs is thoroughly developing on various levels, and according to insistent reports, some high grade ore has been encountered. The Junction is preparing to cut a station on the 1,200-foot level, which will be finished in about three weeks on account of the hardness of the rock at this depth. In the west drift on the 1,200-foot level, a new ore body has been encountered which runs from four to six per cent. in sulphides. This is the first sulphide ore encountered on this level. A new pump, known as a crank and fly wheel style, has been installed on the 1,000-foot level. The power is furnished by a Nordberg engine with a Prescott water end. This is the first pump of its kind installed in the district. It has a capacity of 1,000 gallons per minute, which brings the total amount of water raised at this shaft to 3,115 gallons per minute.

The Wolverine & Arizona stockholders' meeting was held in Bisbee on Wednesday, November 27th. No business of importance was transacted, with the exception of the reelection of the nine directors, who are: John Daniels, Paul B. Roehm, Edward Ulseth, Charles Chynoweth, Fred Smith, W. Frank James, Benjamin Chynoweth, William H. Brophy and M. J. Cunningham. At the property of the company development work is still being prosecuted with vigor, and it is evident that this mine will be one of the big producers of the district.

The Shattuck-Arizona bulkheads which were placed in the mine last week on account of the fire at this property were removed on Monday afternoon. The damage by the fire was not as great as expected, and Superintendent B. M. Pattison states that $1,000 will cover all the loss by the flames. Some of the guides were burned and many of the timbers charred, but the latter need not necessarily be changed at present. The fire was found to have originated at the 800-foot station, but the cause is yet unknown. The work of repairing the damage has been commenced and will be finished in a short time.

On the Denn-Arizona the only work being done is a little pumping, just enough to keep the water down. Preparations will soon be begun for the placing of a diamond drill on the 1,100-foot level.

On the Warren sinking is still being continued. No news of special interest being obtainable, except that some good indications have been encountered.

Colonel L. W. Powell, manager of the Calumet & Arizona, has gone to Los Angeles.

John H. Talbot, of Cochise county, has returned from Leadville, where he has been in the interests of the Cole faction. The properties are in good condition.

William Wiley and John Wilson left today for a point fifty miles south of Hermosillo, Sonora, Mexico, where they will sink a shaft on property controlled by Chicago parties.

The Anderson company has issued a call for 50 cents per share.

Many miners are at work on their assessments in the district.

It is rumored that the old Easter Sunday property will soon be reworked. This property lies about a mile east of the American-Saginaw and has good rock running as high as $40 in gold.

The Lucky Cuss shaft house at Tombstone was burned to the ground on Wednesday night. Loss estimated at $3,000. The origin of the fire is a mystery.

Albuquerque, New Mexico

November 30th.—Christopher McGrath, well-known mining engineer, who has been in charge of mines in Mexico for the past several years, and who has recently located in New Mexicon, has signed a contract with L. G. Rosenfield by which he will take charge of the Alvardo mine in Helt canon, and push the work that the late J. E. Geddes was to have done.

Mr. McGrath assumed charge of the property yesterday with a force of a dozen miners. Mr. Rosenfield has furnished him with a complete mining outfit and after the completion of the preliminary work he expects to proceed with the sinking of the shaft.

The body of Geddes, the mining expert who died here suddenly last week, will probably be buried in Albuquerque, as the relatives have failed to answer any of the several telegrams sent to them by Undertaker A. Borders, who proposes to investigate fully the mining properties which Geddes is reputed to own in northern New Mexico and western Oklahoma.

That Albuquerque is to have yet another railroad is evident from the fact that there have been filed with the secretary of the state of Oklahoma articles of incorporation of the Jefferson City Albuquerque and San Diego Railroad Company. The incorporators named in the papers are J. H. Langston and O. H. Jent, of Guymon, Oklahoma; J. H. Harris, of Carthage, Missouri; W. F. Bort, of Wichita, Kansas, and C. R. Wright, of Liberal Kansas. The capital stock of the road is placed at $7,000,000. The incorporators are well-known railroad men and capitalists. The proposed road, it is understood, it is extend through Kansas City and Oklahoma, from Jefferson City, Missouri; then west through New Mexico and across Arizona and California in a bee line for San Diego.

Little can be learned of the real capital behind the incorporation of this road, which is, however, believed to be a Rock Island project.

there is a shortage of currency ew Mexico it is not causing much le. In fact, there seems to be evidence remaining in this city ast, that there has ever been any for care in conserving the coin. same condition seems to be true long the line of the Santa Fe in Mexico and Arizona. Yesterday the railroad pay day in the south- and at every division point big hes of money were turned loose. lbuquerque it is estimated that at $100,000 in cash was turned yesterday to cover the railroad other pay rolls. All pay checks out here were paid in cash, mer- ts giving money for them in all where desired, and the banks g cash for the checks. At Las s, San Marcial and elsewhere in erritory money was paid for the ad checks, and as a result a very amount of currency will be in lation Monday in New Mexico. itions in this territory appear to returned almost entirely to nor-

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Denver

c. 4.—Mining operations and all branches of business throughout tate appear to be in good shape he winter. Judging from the bril- sunshine we have had during the few weeks, we are not to have winter. The latter part of No- er and thus far in December the her has been more like May and than November and December. re seems to be doing her best to ensate the country for its finan- and other follies.

wever, we have had no bank fail- no mining failures, business fail- or any other failures in the state g all these exciting weeks in parts of the country. Our peo- ave pushed ahead with the faith removes mountains and the en- and ability to overcome all ob- es. No state ever presented a ter future to the business world does Colorado today. She is peer- in her resources, prosperity and bilities, and no ordinary calamity imperil her onward march.

ildings are going up in all parts e city. Public improvements are ogress as if it were midsummer. t business blocks are rising in ly grandeur in dozens of places, a thousand beautiful cottages are ling into form to accommodate omeseekers who are anxious to in a land that flows with milk oney. And what applies to Den- vill apply to the entire state in a sponding degree. Colorado is a beehive of industry and enter-

Our holiday trade is even greater than it was last year. It is an evidence of the prosperity that is general among the people.

The Salt Lake Herald, in criticizing that great juggler of statistics, Henry Clews, on the Eastern financial situation, has the following to say of the humors of finance:

"If a man doesn't happen to be loaded up with copper stocks or railroad securities or some form of depreciated investment, the financial situation, as explained by the New Yorkers, is not without its humorous phases. For instance, Henry Clews, who is something of a literary artist himself, says:

" 'Once more the stock market has fallen under the domination of a stringent money market. Business in the interior is active, crop demands are asserting themselves and the autumnal demand for currency has set in with its usual vigor. Coming at a time when our bank reserves are low, and when our credit facilities abroad have been curtailed, the natural result is high rates for money with a consequent depressing effect upon securities.

" 'Secretary Cortelyou has afforded considerable assistance, having thus far deposited $40,000,000 with the banks within the time limit which expired this week. Whether he will still further increase these deposits is not known; but the treasury balance is now $165,000,000 and much depends upon the emergency. At the moment both speculative and investment buying is apparently exhausted. A fair recovery in securities has taken place from the low prices of August, and the disposition is rather to take profits than to make new commitments when money finds such profitable employment outside of the security market.'

"Then Mr. Clews says that whereas this country has placed loans abroad in previous years to the amount of $200,000,000 to $400,000,000, it is doubtful whether a fraction of that sum could be placed this year. Right there Henry stops—although it is the crux of the financial situation.

"Why doesn't Europe want to lend us hundreds of millions? Mr. Clews led up to the question, but balked just as he reached the point. He had a delicacy about saying what all Wall Street knows, that Europe is afraid of our securities since the disclosure of high finance made by the most conspicuous security manufacturers of America. Come to think about it, nothing could be simpler than the withdrawal of confidence in loans on such securities, though it is a pity that the good and the bad should suffer alike from the wrongdoings of a few.

"There is another phase of conditions, however, which is more cheerful; the crops, as Mr. Clews says in criticism, call for so much money that speculators have to pay big rates for call loans. Why not? Why isn't it a good plan to let the farmer and grain dealers, the cotton planters and brokers have the money at decent rates rather than make them suffer for the benefit of speculators? Legitimate business ought to come first in the consideration of conservative bankers; and that is what is happening now, to the great satisfaction of the real prosperity-makers of the country. So long as nothing worse ails the country than a plethora of wheat and corn and cotton, the people outside of the speculative centers will try to be comforted as best they may. Some of them may even be cheerful about it."

Parral, Chihuahua, Mexico

Nov. 29.—This part of Mexico is driving ahead in a commendable manner. The mining interests are in good shape and other industries are keeping step to the music. The financial shock you people up in the United States got jarred us a little, but we have about recovered, and our eyes and ears are now opened for news from Uncle Sam.

President Diaz says we have passed the stage when financial disturbances in other countries will seriously interrupt business in Mexico. For a brief period it may make investments from the outside a little slow, but in the end it will send a largely increased amount of foreign capital to this country where it will feel safe and the opportunities are so great.

In the El Porvenir No. 3 and Dudosa mines, owned by the El Porvenir Mining Company, a corporation controlled chiefly in Europe, some fine ore bodies have recently been disclosed and the mines are undergoing thorough and systematic development. Manager Wilson has not yet opened the El Porvenir extensively, owing to the fact that the ore bodies in the Dudosa were more accessible and easier developed through the San Cristobal and El Caiman mines, which are on the same vein. The San Cristobal and El Caiman, the latter now known as the San Jose, have been producers in a primitive way for 250 years, having been worked by the Spaniards during the first settlement of this portion of Mexico and have been more or less continuously worked since.

Mr. Wilson expects to begin shipping from this point as soon as he

can get enough ground opened up to put a few men in stoping ore. He thinks he can make the company some money in this 200-foot level, but says he does not expect to reach the bonanza in this ore shoot short of 300 to 500 feet in depth because the great bonanzas in the mines surrounding in this district have encountered their best ores at these depths, with possibly one or two exceptions, and this can be said of all fissure vein mining districts.

Mr. Wilson is now pushing the work on No. 1 shaft or the one heretofore spoken of as the main working shaft, in order to attain a depth of 500 feet, where the San Cristobal and Caiman vein will be intersected and a bonanza obtained giving about 160 feet of stoping ground before reaching up to where the vein crosses his line on its dip, and with a known ore body for at least 2,000 feet along the vein.

It is reported that the French stockholders, who own 50,000 shares of Eugene Davis' Capuzaya Mining Company, which owns the mine of that name in the Parral district, are to stand with the Americans in the company in ousting Davis and Treasurer Bryan and reorganizing the corporation, according to the statements made by Georges Bret of Paris, and Louis Notte of Belgium, who are in Mexico City, as the representatives of these foreign stockholders. They have visited Washington and agreed to stand for the new program.

Eugene Davis was represented in Europe by Schell Bros. of Paris and all the Capuzaya stock was sold through them. In most instances the prices were as high as $9 gold per share, with an assurance that it would be worth $25 within a year, according to Messrs. Bret and Notte's statements. Davis had Capuzaya capitalized at $5,000,000 gold, divided into $6 shares, and was selling stock in Europe on a basis of $9,000,000 valuation for the Capuzaya mine—and it has never been a producer.

Our neighbor, the rich and beautiful old city of Durango, is preparing to have a great fair next year. Durango is one of the most beautiful cities in Mexico. It has an ideal climate and is surrounded by tall mountains impregnated with rich minerals of all classes and covered with valuable timber. These mountains are divided by fertile valleys where rivers flow the year round and every class of vegetation grows. They are beautiful agricultural gardens.

The city is full of rich merchants, bankers and retired capitalists and the country around it is populated with well-to-do farmers and wealthy miners.

The citizens of Durango have now decided to give an exhibition in 1908 for the purpose of displaying some of their products to the outside world. The work of clearing the grounds for the exhibition has already commenced. The medals and diplomas for premiums will be ordered from Paris.

Wallace, Idaho

Nov. 29.—The fore part of the month a very rich strike was reported in the Gold Craig mine, located in the gold-bearing region around the head of Cedar creek in Missoula county, Mont. The Gold Craig has undergone considerable development and recently has shown some highly favorable results, ranging from $66.46 to $7,845 to the ton, chiefly in gold.

Manager Reuben Fuller, who was the discoverer and locator of the property, returned to Wallace a few days ago from the mine with a sack of the ore that opened the eyes of a lot of the old prospectors and miners that had been running over the ground for years. Mr. Fuller says:

"The mine is looking great and improving right along as development progresses. The main tunnel is now in 245 feet and is disclosing fine ore. The crosscut run to the hanging wall shows the ledge to have width of thirty feet and mineral clear across. We shall run another crosscut next month and at the same time continue the main tunnel. The plan is to open up a vast tonnage of ore as soon as possible and later erect a milling plant to treat the lower grade ores."

Speaking of other properties in the immediate vicinity, Mr. Fuller said:

"The quartz veins covered by the La Casse placers are being explored and will be extensively worked next season. The Chicago-Kansas City syndicate have forty claims under development and expect to open up one of the largest mines in the northwest. The Thompson-Ward property also has a fine showing of rich ore. The Cedar Creek gold region is bound to come to the front and nothing can stop its progress."

Last week Mines and Metals reported a valuable strike in the Golden Eagle mine, represented by a chunk of ore weighing 195 pounds. Previous assays gave the following returns: Zinc 30%, lead 10%, silver 5½ ozs. per ton. The sample of ore referred to was taken from the vein where it is intersected by a 200-foot crosscut tunnel at depth of approximately 150 feet. At this point two feet of good ore was encountered and several feet of strongly-mineralized ledge matter. The vein is now being explored by east and west drifts from the crosscut, hence it will be some time before the extent of the ore deposit will be known.

The Golden Eagle is located across the gulch from the well known Glen Metals mine on Spring creek, three miles north from Iron Mountain and the same distance from the Northern Pacific railroad. The company's ground covers 6,000 feet of what is supposed to be the west extension of the Iron Mountain (or Pardee) mine vein. The Iron Mountain mine is now being opened by means of a 5,600-foot lower crosscut now nearing completion. From the upper workings ore of the value of $1,000,000 has been extracted. In these levels the lead-silver shoot had length of about 600 feet and was paralleled by a zinc ore shoot that was left standing, as the mill equipping was not such as to treat zinciferous ores. As the essential characteristics of the Golden Eagle are similar to those of the Iron Mountain, the owners of the former believe they have the making of a big producer.

The Golden Eagle company is composed of wide-awake, hustling Mullan men who will push development work through the winter. The main office of the company is at Mullan. Emil Linnarson and William Hutchinson being president and secretary, respectively.

The Josephine Copper Mining Company was recently incorporated by prominent men of Missoula, where the main office of the company is located. The capitalization of the company is 1,000,000 shares, par value $1 each, 400,000 shares having been placed in the treasury.

Goldfield, Nevada

December 2nd the Mine Owners' association of this city has taken time by the forelock in the legal industrial disturbance between the operators and miners, and a communication to the union declaring that by reason of the strike on account of the payment of wages in scrip all agreements heretofore made with the miners are declared off. It is hoped the matter will soon be settled and new contracts made. For the time being it is a severe blow to this camp, although most of the larger mines and some of the smaller ones are going ahead with diminished forces of nonunion men. How long the trouble will last is problematical.

We are in hopes the present congress will pass a bill creating an arbitration committee or court, to settle the labor troubles of this country by law, justly, equitably and permanently. Such a court or committee should be able, non-partisan and composed of men ready to act promptly and fearless in their line of duty. The labor trou-

bles of this country have become a serious problem, costing the nation and individuals millions of dollars annually in the loss of labor and the general disruption of business. The question should be handled without delay by the national government.

From Fairview came reports that the shortage of currency has sent a largely increased number of prospectors into the field, but the financial flurry has past with us and the clouds have lifted. A prospector says in a recent trip by auto from Goldfield to Fairview no less than a dozen prospectors' camps were observed along the way. The good effect is felt in new discoveries and a general revival in several of the younger camps.

Two months ago the Rawhide camp was not heard of. Now it numbers a population of 1,500 hustling people and more coming every day.

The banks of Nevada, as well as those of California, have weathered the financial storm remarkably well. In fact, all branches of business have pulled through with flying colors. Investments were withheld for a time, and money crawled into its hiding places, but confidence is beginning to assert itself and business is quickening its pace.

In response to the call of Governor Gillett of California, the legislature convened at Sacramento in extra session on the 15th of November at 10 o'clock a. m., accomplished its business and adjourned sine die at 12 m. the same day, having enacted practically all the legislation that was called for in the Governor's proclamation.

At 1 o'clock a second extra session convened to ratify sixteen amendments to the San Francisco charter, not included in the first call. The most important measures passed were those extending the payment of taxes until the last Monday in January, or sixty days; the throwing open of the doors of the courts of justice, which have been stopped for several weeks by the declaration of holidays; the Islais Creek harbor bill; the appointment of a legislative committee to investigate the banks, trust companies and the banking laws of the state; that more stringent laws might be passed at the next legislature for the better protection of the depositors; and the ratification of the San Francisco charter amendments, four in the first extra session, and sixteen in the supplementary session.

The second extra session of the legislature was in session less than two hours and adjourned sine die shortly before 3 o'clock. The ratification of the San Francisco charter amendments was but a formal matter.

Wil Ask Congress to Change Law

(Special Correspondence.)

An effort is being made to get Congress to suspend the assessment law compelling assessment work on mines for the next year on account of the so-called existing hard times. When the panic of 1893 occurred Congress passed an act extending the exemption payment for another year. In 1897, Congress also passed an act exempting those who enlisted in the Spanish war from the operation of the mining law so there is precedent for the suspension of the law now.

The Los Angeles Chamber of Mines on November 9, 1907, adopted the following resolutions:

That, In view of the peculiar financial conditions prevailing in our country at the present time, from which conditions there is, unfortunately, no immediate prospect of relief; and

That, In view of the further fact that, in consequence of said financial status, the possessors of mining claims have been encountering great difficulty in raising the necessary funds for the performance on such claims of the assessment work required by law; and

That, In view of the further fact that, unless some immediate preventive measures are adopted, there is great danger of attempts at the "jumping" of claims, and possible lawlessness and riot in the mining districts;

Now, therefore, Be it resolved that the Los Angeles Chamber of Mines hereby heartily endorses and urges, upon the part of our National Congress, immediate action, looking to the waiving, during the year 1907 and 1908 of those provisions of the national law requiring the performance of assessment work upon mining claims.

Congress meets on December 10, 1907, and those favoring the idea should at once write to the senators and congressmen representing them asking them to favor the passage of such an act. Such a law would give temporary relief to thousands of men who are struggling to hold their property in the mining states. Prospectors as a rule are not overloaded with wealth, but their efforts have given to the nation as much wealth as any other class of men and now in time of need the nation should help them.

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Natick House,
Los Angeles, Cal.:

My Dear Sir:—Permit me to hand you herewith copy of resolution adopted at a recent meeting of our Board of Directors. The chamber is now taking active steps to bring this very important matter to the notice of our legislators with a view to having it receive attention at the coming session of our National Congress. You doubtless are aware of the conditions existing at the different mining camps, and of the difficulty experienced generally in raising the necessary funds for the performance of the legal assessment work. There is precedent for this request on our part, inasmuch as during the panic of 1893 Congress passed such an act of exemption, and a similar act was passed in 1894. My reason for sending this to you is that you may give the matter publicity in your valued journal, and also lend such other aid as may lie in your power in bringing our efforts to a successful issue.

Very truly yours,
GEO. W. ARNDT,
Secretary.

BRITISH STUDENTS IN CANADA.

It is proposed that a party of from 50 to 100 university students, chiefly those taking a scientific course in the colleges of Great Britain, shall make an eight weeks' tour of Canada. The intention is that the students shall visit numerous industrial plants in the various parts of the Dominion so as to give them an adequate idea of the industries established and in operation. Lord Strathcona, high commissioner of Canada in London, is president of the committee having this matter in hand, and Sir Wilfred Laurier, prime minister of Canada, one of the patrons. The secretary, a young Canadian engineer resident in London, was in British Columbia lately in connection with this proposal.

An oiler looking like a turnbuckle and nearly as strong is used about the mines in the Rainy Lake district of Canada. It is made of a piece of one-half-inch iron pipe, one end welded up solid and the other end closed down and a one-half-inch nut welded in. The stopper which screws in has an eye by which the oiler may be hung up, or a string may be attached to it. The oiler, without the plug, is about fourteen inches long and carries oil enough for one shift.

Getting Results

Mines & Mining,
Denver, Colo.

Gentlemen: Two orders from Mexico have been received so far, and same is result of my ad. in Mines & Mining.

B. F. KELLY,
Kelly Candle Stick.
Atlas Block, Salt Lake City.

Movements in Mining Camps of World

Only Authenticated Reports Will Be Admitted to These Columns

ARIZONA

Cochise County.—The flow of gas generated in some old stopes along the dividing line of the Calumet and Arizona and Copper Queen properties between the Gardiner and Irish Mag shafts, has been confined with the aid of bulkheads to an area of worked out country. The damage done to the Shattuck-Arizona by fire is at present unknown..—Since a new eight horsepower gasoline engine has been installed on the North Bisbee property in Tombstone canon, drifting is in progress on the sixty-five-foot level and rich stringers have been encountered. —President Guthrie of the Arizona Apache Mining Company, which had suspended operations in the Keystone district during the copper slump, announces that the mines of the company will be opened about January 1st and that a larger force will be employed with greater development.—At the depth of 800 feet, 200 feet below the water level, in the Emerald shaft of the Tombstone Consolidated Mines Company at Tombstone, has been found a remarkable ore body, running high in gold and silver and eight per cent in copper. In the ore is considerable horn silver and native silver, the value of the product closely approximating that which made the mine such a bonanza in the early days of the camp. The company has determined to spend $75,000 more on pumping equipment.—Two new tunnels from the months of which a gravity railroad will be run, are to be driven on the Lutz property in the Huachuca mountains, formerly known as the exposed reef.

Gila County.—Promising indications for sulphide ore are in evidence on the sixteenth level of the Old Dominion mine. Three roasters are being run on good ore at the smelter.—Calumet and Globe company will abandon its option and discontinue operations on Lower Pinto Creek, unless a more favorable report is made by the expert now examining it.—The Independence Development Company will next spring install a concentrating plant on its property on Lyons fork of Mineral Creek, about twenty-two miles from Globe. A first class wagon road has been completed into Globe.

Mohave County.—A. G. Alm reports a strike of high grade ore on his claims in the neighborhood of Fort Rock, where he has a small force of men operating.—Development work is being prepared for on the mines of the Franconia Mining Company.—A small force is being engaged on the Golden Eagle mine and good ore constantly opened up.—Samples from a shipment of ore sent from the claims of Ernest Solomon near Boulder Springs are said to have run over 100 ounces in gold to the ton, the ore being liberally sprinkled with the yellow metal.—Only the necesary assessment work will be done this winter on claims in the Bill Williams Fork section owing to the financial stringency.—Buchanan and Chittondon are reported to have found rich silver ore near Boulder Springs, where they are now at work.—A. L. McKesson has developed enough water in his mine south of Kingman and as large quantities of excellent milling ore have been recently revealed, it is doubtless that a mill will be installed within a very short time.—John Hughes and partner, mining in the Fort Rock section, are running a drift to cut the main vein at a depth of 200 feet. Rich copper glance was obtained in following a stringer from the main ore body.

Pinal County.—It is reported that work will be suspended on the Superior mine twenty-five miles north of Florence.—The Tip Top mines near Tucson, of which half the purchase price was paid a year ago by the Guggenheims, has reverted to its original owners, the mining committee of the firm having refused to approve the purchase.—About a mile north of Troy, L. W. Kiggins is operating a two-stamp mill driven by a gasoline engine with a self-feeder, the plant crushing seven tons of ore a day.

Yavapai County.—A receiver has been appointed for the Arizona Smelter Company and the Consolidated Smelter Company, whose property consists of the Humboldt smelter in the Big Bug district south of Prescott, their liabilities amounting to $1,500,000.—J. W. Boileau aserts that the project of a smelter near Prescott has not been abandoned, but will be deferred until a million dollar fund has been realized.—The new shaft of the Sycamore is now down 290 feet and the pump at the 233-foot station raises in twenty minutes the inflow of an hour and a half so that the remaining time is consumed by sinking. With the installation of the new eighty horsepower boiler all the machinery will be in operation.—A new tunel four and one-half by six feet in the clear will be driven to a depth of 700 feet on the ground of the Two Republics Mining Company ten miles from Jerome. The wagon road leading to the property has been completed.— J. E. Leeper has bought from O. E. Allison and W. S. Owen their group of three claims, the Steamboat and two others, a mile from the United Verde, for the sum of $15,000.—The Arkansas and Arizona shaft has passed through the wash formation into a decomposed formation of rich bearing red porphyry.—A full complement of three shifts is sinking on the Verde Grande, now down to the 330-foot level in a black slate and quartz carrying sulphides in the same quantities as were taken from the shaft during the past month. The Boston-Jerome, an extension of the Verde Grande, is being rapidly sunk through porphyry and schist with some copper sulphide.—Senator Clark, after an inspection, declared himself well pleased with the United Verde mines and smelter.—Rich ore has been exposed on the Hull and Cleopatra properties.—The Eureka tunnel is now thought to be within twenty feet of the ledge.—The work of retimbering the Little Daisy has been completed and sinking has been in progress for some days.—The smelter of the United Verde Company at Jerome has two furnaces in operation, producing 2,500,000 pounds of copper a month.—The Harqua Hala Mining Company, operating the Bonanza and Golden Eagle at Harqua Hala, has 200,000 tons of tailings on its dumps worth $3 a ton in gold, for the treatment of which a cyanide plant will in all probability be soon erected.

COLORADO

Boulder County.—The old Lee S. above Sunset has resumed under the management of John Wessel for St. Louis parties, who is clearing out the old workings and overhauling the machinery with a considerable force of men employed.—The shaft of the Cashier at Rowena has been unwatered and it is reported that sinking will be continued.—The drift at the 100-foot level west from the Addison shaft of the Golden Message group north of Sunshine, is in a large vein of milling ore streaked with high grade tellurium. Dr. H. A. Berry, president of the company, is arranging to have the entire group patented.—The fifty-ton Interocean mill at Sunshine is being thoroughly overhauled. In the 150 and 300-foot levels of the mine, a large vein of

good milling ore is in sight.—It is reported that work will be resumed on the Humboldt mine and mill of fifteen stamps, which has been repaired and modernized. In a 225-foot shaft on the property there is a well defined vein twelve to twenty or thirty inches wide of gold bearing smelting ore, and from 15,000 to 20,000 tons of low grade ore have been blocked out in the reserves. —The Modoc shaft will be sunk an additional 200 feet as soon as the working force of the mine is reorganized.—I. S. Stapp and L. S. Moe of Fremont, Nebraska, have located four claims at the extreme head of the middle fork of St. Vrain Creek, two and one-half miles northwest of Stapp's lake, where there is an immense vein extending from the bed of the creek to above timberline, from which assay tests show value of from $1.80 to $700 a ton in gold.—Samples of ore taken from the old workings of the Ward Rose assayed 4.40 ounces gold and 8.40 ounces gold to the ton.—H. R. Rowley, Scott Williams and Hugh Owens have taken over the Grand View lode south of Nederland on bond and lease from George and Frank Sissons.—The Wolf Tongue mill is being overhauled preparatory to resumption.—Five men are employed driving a tunnel on the group of the Sissons brothers on Beaver Creek, which, now sixty feet from the portal, will in sixty feet more cut the dyke where a shaft shows a large body of good grade ore. The dyke will be intersected at a depth of 125 feet.—The Clyde shaft of the Wolf Tongue Company is now 280 feet deep, being sunk under contract.—The Steine and Boericke tungsten mill in Gordon gulch is being overhauled and equipped with new machinery.

Chaffee County.—A carload of graphite has been shipped from the graphite mine at Turret.—The east and west drifts of the Gold Bug at Turret are advancing at the rate of over three feet a day.—The Salida Granite Company has increased its force at the quarry.

Clear Creek County.—William Wood, superintendent of the Whiting Mining and Milling Company, has leased the Terrible-Dunderberg mines belonging to the company and worked to a depth of 1,400 feet.—The new cross-cut tunnel of the Atlantic Mining and Milling Company is now under cover, and with a force of five men is being driven at the rate of from one to two feet a day.—The Black Prince tunnel on Green Lake Mountain is now in 300 feet. About the first of the year work will be resumed on the Alaska tunnel. —Jacobs and Miller, leasing on the Wheeling vein through the Tobin tunnel 450 feet from the entrance, have shipped a carload of smelting ore to the Chamberlain-Dillingham sampler in Georgetown.—The Ramsdell Gold Mining and Milling Company will generate the power for its new mill by means of a water right on Bard Creek. Drifting will be resumed to the west on the Market cross-cut tunnel at a distance of 275 feet from the portal where a six-foot body of ore had been followed before the working force was confined to the erection of the mill.—The Lincoln cross-cut on Lincoln Mountain has been advanced for about 900 feet.—F. A. Maxwell, lessee of the Colorado - Central - Aliunde properties has a force of men breaking ore from the Sleepy drift of the Equator, the vein being from three to six feet wide consisting of lead-zinc, which must be concentrated for the separation of the two metals.—The McKinley adit on Lincoln Mountain has been driven over 300 feet, showing a six to ten-inch lead streak on the breast and a two-foot body of quartz heavily mineralized.—Bryant and company, leasing a block of ground in the Bellevue-Hudson, have increased their force and are making a test shipment of high grade ore from a streak on the hanging wall from six to ten inches in thickness showing ruby silver and gray copper and carrying values of from 600 to 900 ounces silver to the ton. Ore from the footwall runs from 200 to 225 ounces silver.—At the east of the stope on the Cram vein in the Doric tunnel the ore averages above $130 to the ton in gold, silver, lead and copper, while at the west end it will mill about $19 to the ton.—Butler and company, leasing on the Wheeling vein through the Tobin tunnel, have sent two cars of smelting ore to the Chamberlain-Dillingham sampler at Georgetown.—Work was resumed recently upon the holding of the Leavenworth Mountain Mining and Milling Company, situated on Paynes Peak.

Gilpin County.—The Pearl Tatum Company is employing three shifts on the Sleepy Hollow mine in the Gregory district and making regular shipments to the Boston mill. A three-foot shoot has been encountered in the 935-foot east drift. As soon as the hoister is remodeled the working force of sixteen will be further augmented.—The Vigilant Mining and Milling Company, operating the Mabel tunnel below the junction of Russel and Willis gulches, is extending a drift east at a depth of 150 feet in the shaft below the adit level, where there are about two feet of ore which brought returns of $80 to the ton in gold, silver, lead and copper at the Denver smelter. An order has been placed for an up-to-date mill to be erected next spring.—The Gilpin Tramway Company will haul between 125 and 130 more carloads of ore from the mines to the mills and sampling works during this month than last month.—The Gilpin Independence Mining Company has installed a four-drill Clayton compressor at the Golden Flint mine near Perigo. Drifting is in progress both in the Golden Flint and McFarlane shafts, the Golden Flint furnishing an outlet for the McFarlane ores. —The Gilpin Eldorado Mining Company has begun drifting on both sides at the bottom of the 300-foot shaft of the Eldorado mine in Spring Gulch. Stoping has commenced on the ore shoot in the west 170-foot level.—About twenty leasers are at work on five levels of the Chicago-Carr mine on Bobtail hill, where sinking has been resumed with Sullivan drills at a depth of 660 feet.—The Golden Rod mine in Silver Creek is being developed under a small force.—Pumping has been discontinued at the Evergreen mine in the Pine district until the completion of the new concentrators next February. —The Saratoga is producing three-ounce gold ore from its Newhouse tunnel level.—Shipments have begun to be made from the Ralls County mine on Quartz Hill.

Gunnison County.—Manager C. L. Arzeno of the Augusta properties near Crested Butte is superintending the completion of the tram from the tunnel to the mill, which has been delayed by the railroad sidetracking the machinery. The mill is being remodeled and with the mine will be operated during the winter.—It is rumored that Crested Butte and Gothic will be connected with the Taylor River electric railway line which is to be operated from power generated in Taylor river canon, the railroad to have its outlet up Willow creek, over Cottonwood pass and down the stream to Buena Vista.—The Elk Mountain Mining Company has its compressor in operation and will carry on work during the winter.—The Usona Tunnel Company is puting in winter suplies for a large force of men. —The Brant Company's mill near Pitkin is soon to resume.

Hinsdale County.—B. N. Ramsey has taken a bond and lease on the Buckeye and Monte Queen, belonging to C. B. Williams, for a period of two years. —The smelter of the Lake City Mining and Smelting Company will be in commission by the early part of next summer.—The Pelican mine at the base of Sugar Loaf Rock has been connected with the transmission line of the Hinsdale Electric and Power Company.

Lake County.—Ore assaying over six ounces gold and over 100 ounces silver has been discovered 200 feet from the entrance of the Laseter tunnel on the Iler group of claims operated

by the Ontario Mining Company on Mount Elbert.—The Jennie June property in Tennessee gulch has been temporarily shut down.—Tingley S. Wood has sold his controlling interest in the Lillian mine in Iowa gulch to Walter Farrel and Charles E. Harding of Chicago.—The Halcyon Mining Company has ordered a temporary shut-down on the Bartlett tunnel.—The Swisher tunnel in the Sugar Loaf district is now in over 1,000 feet.—The Dinero tunnel has now reached a distance of 1,600 feet into the mountain.

Mineral County.—It is understood that Silas Frank has sold his bond and lease on the Corsair group of claims at Sunnyside to a new company which will proceed to develop the property.—Arthur Weaver and Roy Fisher are driving the Judson tunnel at the rate of four feet a day and have encountered a six-foot vein of ore on which they are drifting.—Shipments from Creede for the week ending November 30th amounted to 865 tons.—The Mammoth Company has driven its tunnel a distance of 1,850 feet from the portal.—Henry Benedix has located a twenty-foot body of ore in the Spar district assaying on the surface twelve ounces silver to the ton.

Ouray County.—It is reported that the Valkyrie Gold Mining Company has met with a streak of lead and copper shipping ore twenty inches wide fifty feet from the entrance of the Valkyrie tunnel and fifty feet from the surface.—The ore bin at the Atlas mill has been enlarged for thirty additional stamps, of which ten will be installed during the winter.—Two carloads of ore were shipped recently from the Grizzly Bear.

San Miguel County.—The new mill of the Calumet-Telluride Company on the Prospector group in Chapman gulch will be in operation by the coming spring, the power to be furnished from an electric plant on the Obrien placer group, lately purchased by the company, at the mouth of Swamp canon, where a valuable water right exists. The tunnel on the Prospector lode which is a true fissure vein averaging from two to three feet between walls carrying gold and silver ores of good concentrating values, is now being hand-drilled by three shifts. In the coming season air compressors and power drills will be installed.—The Rosenveldt-Tracy Company at Sawpit is operating its ten-stamp mill formerly known as the National mill on twenty tons daily of $8 and $10 ore from the Lizzie G. property, the concentrated product running eight ounces gold, sixteen ounces silver and twenty per cent lead. The mill is operating night and day shifts and twenty men are working at the mine.

Summit County.—The Blue Flag Company at Breckenridge is employing twelve men at the mine and mill, two cars of concentrates being shipped from the mill recently.—The Dunkin Leasing Company has about twenty tons of ore awaiting shipment.—The Senator mine has temporarily suspended operations owing to the incapacity of the mill to handle the output.

Teller County.—The Evelyn Leasing Company at Breckenridge, operating at a depth of 500 feet on the Roman claim of the Requa Savage Gold Mining Company, on the eastern slope of Beason hill, sent out a trial shipment from a new and rich ore shoot south of the shaft, assays running as high as five ounces gold to the ton.—The ore body on the Pittsburg claim on the southwest slope of Grouse mountain has widened to almost three feet between walls with values of from one to three ounces gold.—Reid and Young have secured a long lease on the center block of the Delmonico property on Bull hill.—The British-American Mining & Development Company has purchased a hoist from the Hendrie & Bolthoff Manufacturing Company. It will be used on their Dante lease on the Bull hill.—The Vindicator Gold Mining Company is negotiating for a lease on the C. O. D. property.—A miner employed by Herrich McLeod and associates leasing on the Gold Bond property on Gold Hill, escaped with but serious injury from the explosion of dynamite which he was tamping into a drill hole. Several tons of rock were sent to the floor by the premature shot.

MEXICO

Chihuahua.—The El Porvenir Mining Company has taken ore from the El Porvenir No. 3 near Parral, that asayed as high as seven ounces gold and ninety-six ounces silver to the ton. The No. 1 or main shaft will be sunk to a depth of 500 feet, where the San Cristobal and Caiman vein will be intersected, and it is hoped a bonanza obtained.—The approximate production of Parral for the month of October was 40,980 tons, of which 15,950 tons were shipped and 25,030 locally treated.—At a 200-foot depth ore running fifty-six ounces gold and 2,614 ounces silver to the ton has been encountered in the Greene-Gold-Silver Company's Navidad mine at Cocheno. At the 500 and 700-foot levels two other strikes have been made running $93 in gold.—The Veta Colorado Mining and Smelting Company of Parral has curtailed its force by forty men.—H. E. Bodington, general manager of the Uruachic Mining and Smelting company in the Rayon district, is inspecting the mines with Dr. L. D. Godshall, the smelting expert, with a view to erecting a smelting plant.—The San Patricio mine, formerly under option to the Parral corporation, a New York syndicate, is being opened up again by the principal owner, Don Francisco Gomez.

Guanajuato.—The Ruby Silver tunnel located in the La Luz district and adjacent to the famous San Jose de Gracia mine is now advancing, at a depth of 700 feet, to cut the Puerta, San Jose de Gracia and Refugio veins.—Ed and Jack Griffin have unwatered their San Luis Flores de Oro mine bonded from Braulio Acosta, and at the 100-foot level have uncovered a vein from one to three meters wide averaging 400 to 500 grams gold, of which they have $150,000 worth in sight.—Beginning with December, work will be suspended in the Pozo de los Castillos.—A shaft is being sunk on the Gato Montes property on a vein that crops on surface over thirty feet in width. At the bottom of the shaft, at the present writing, 100 feet from surface, asays clear across the shaft, fourteen grams gold (18.60) to the ton.

Guerrero.—Twenty pertinencias on the Balsas River have been denounced by J. S. Holthoff of Taxco, who has obtained asays of from twenty to fifty-six per cent copper after exploding two shots in the cliff in which the vein runs two meters wide.—The Mexican Smelting and Refining Company has laid off half its working force, but the mines are supplying the plant sufficient ore to keep it in operation.

Mexico.—The Socovan de San Fernando Mining Company has decided to increase the number of its shares to 2,000 at a par value of $50 each.—The Santa Casilda Copper Company will erect a concentrating mill and continue extensive development.—It is rumored that San Francisco capitalists will purchase the Sultepec mines of the Cia. Mra. La Quemica y Anexas, which have a production record of over three millions.

Nuevo Leon.—La Cia. Mra. de Santo Tomas has discovered in the new workings at Montorey, known as La Fortuna, a large ore manta carrying twenty-six per cent. lead, 150 grams of silver and forty per cent. iron. Also in Las Delicias and in La Escondida fine mantas of iron ore, five meters wide and a hundred broad have been opened, and the ore is being cleaned for shipment.

Oaxaca.—The Tehuantepec Silver Mines Company has taken over the

rty of the Campania Minera San isco de Taviche, which has pro- about $1,000,000 with shallow de- nent, and will install a mill. The gs consist of nine and a half per- ias. The lower levels are now ng fifteen kilos of silver and 150 of gold per ton, with the lowest ngs showing the finest ores.

ora.—The Arnold Mining Com- has purchased from the Cananea e people a complete hoisting ap- us for sinking several hundred The Arnold mining property will eveloped more extensively than

NEVADA

urchill County.—Work will be re- l on the June Wonder, which has shut down since spring, a twenty- orse-power engine is being install- d a contract has been let for de- ment. Strong copper showings are idence besides silver.—The Ruby er has started again after a shut- of ten days and the shaft has sunk on the ledge, ore running as as $100 to the ton being extracted. losing the vein at the 150-foot in running a short drift from an se at the 150-foot level, a rich pay was encountered after advancing e feet, carrying values of over to the ton, of which a shipment is being made.—High grade ore is taken from the 100, 200 and 300- levels of the Jack Pot, near Won- three tons being sacked recently e day from a pay shoot in a drift e 200-foot level averaging without g $400 a ton. The force has been ased to twenty men. About 200 are sent a day to the railroad to such time as the smelters will prompt settlement.—At eighty- feet in the shaft of the Pirouette ler last week quartz was un- ed which showed values as high 50 in silver and $18 in gold. E. Colsor, general manager of the any, is inspecting the mines to mine the sort of machinery to be lled.—Work will be resumed on North Star adjoining the Hidden sure group, L. L. Patrick, of the of Patrick, Elliot and Camp, hav- assumed the debts of the North and Alice of Wonder properties. the Hidden Treasure of Wonder, lge has been uncovered seventy- feet wide and carrying shipping s all the way across.

meralda County.—A twenty-foot of ore averaging $50 to the ton been exposed by the Little Flor- Mining Company on the bottom of the shaft, 625 feet below the ce of the shaft. Ore running bet- ter than $4,200 to the ton is being produced from the 400-foot level at the rate of seventy-five tons a day and 2,100 tons of this are piled on the ground.—Car shortage and the raise in smelter rates has determined the officers of the Goldfield Consolidated Mines Company to double the capacity of its Kinkead and Combination mills so as to handle the greatest possible tonage of its output on its own account.—The production of Goldfield for the week ending November 23rd was 5,801 tons at an estimated value of $674,300.

Humboldt County.—Twenty miners are being employed by Gordon and Kimball in the Farrel district, who besides making a rich strike on the Wild Cat, have encountered a five-foot ledge running $200 in gold to the ton at the bottom of a sixty-foot shaft on the Blue Bird.—Mainhart and associates recently cut a nine-inch seam in passing through the main lead near the surface on their property adjoining the Gordon and Kimball strike on the west, asays of over $100 to the ton being obtained. It is the intention of the owner to install a substantial hoist later on.—A prospector by the name of McLean has exposed a twelve-foot ledge in Boyd Basin, averaging about $75 in gold to the ton.

Lander County.—The Nevada Equity Company has begun work on the Moss group, Austin, and is cleaning out the shaft preparatory to putting on a large force of miners. A steam hoist and air compressor will be installed at an early date.—Ore is being sacked and day and night shifts are working on the Dudley B., which will be sunk to a depth of 600 feet.—Mr. Olmsted, who has acquired the interests of John Wholey, T. H. Dalton and C. F. Littrell and the Gallagher group on Union Hill, near Austin, is contemplating the erection of a concentrating plant to handle the low grade ores of the claims.—Asa Baldwin has taken a bond on the Banks lode from the owner, George E. Crowell, and will at once start work on the property, which lies in the town of Austin.

Nye County.—Contracts have been awarded by the Homestake King Consolidated Mining Company to the Colorado Iron Works Company for the construction of a $200,000 amalgamating and cyanide plant of 150 tons daily capacity, to be put up at Rhyolite. The plant will be in operation by next April. A ten-year contract has also been signed by the company with the Nevada-California Power Company.—Lessees on the Pawnee and Griggs-Atwood, at Atwood, have taken out ore assaying as high as $4,000 to the ton in gold, before reaching the water level, which is from thirty to two hundred feet deep.—The Goldyke mill is running steadily on good ore. Ore has been taken from the mine lately running as high as $2 a pound.—The Gold King Mining Company has let a contract for 100 feet of shaft for which a whim has been installed.—On the Gold Crown mine a fifteen horse-power gasoline hoist will be installed at the 200-foot incline, with which sinking to a depth of 300 feet will be prosecuted.—A $75,000 milling plant is to be put on the Congress mine at Johnnie, owned by H. Ramsey, J. Butler, M. H. Bartlett and associates.—At a depth of 210 feet on the Crown Point Globe mine at Johnnie an eighteen-inch vein has been discovered which is said to contain more free gold than rock, and has been planked up and placed under guard until the completion of the Johnnie Consolidated mill about December 10th. D. G. Doubleday of Los Angeles, is principal owner of the mine.—I. M. Williams and Charles Osborne have sacked a ton of ore running 1,001 ounces silver and thirty-five per cent bismuth, or a total value of $1,722 to the ton, from a thirty-five-foot ledge on their property near Round Mountain.—The Todd lease on the Daisy in the Diamondfield section, is idle pending the arrival of pumps to remove the large flow of water in the bottom of the main shaft. When the smelters are ready the Original lease on the Velvet will again operate, having on its dumps a large tonnage of ore that averages above $100 a ton.—Fred G. Bonfils, owner of the Denver Post, announces that if financial conditions improve by the first of the year, he will invest $150,000 in a custom mill for the Bullfrog district.—Two more batteries of five stamps each are being installed on the Gold Bullfrog mill.—The Montgomery Shoshone is producing 150 tons daily with two shifts working, the value of the output for the week ending November 23rd being $67,000.—The 100-stamp mill of the Pittsburg-Silver Peak Consolidated at Blair is expected to be in commission by December 1st. Enough ore is blocked out in the mine to keep the mill runing twenty-five years.—The new mill of the Skidoo Mines Company will be dropping ten stamps by next February 1st.—Practically all the machinery of the Gold Bar mill has been installed.—At a point about sixty feet from the shaft in the west drift on the 236-foot level of the Thanksgiving mine at Manhattan, three feet of ore have been opened up on the footwall of the ledge that will average close to $2,000 a ton.—The shaft of the Neversweat property which is being developed by H. M. Eakin under bond to Salt Lake parties, will be connected

with a tunnel now in about 175 feet.—Tungsten assaying sixty-two per cent or $750 to the ton has been discovered in the Atwood district.—Oxidized ore at 210 feet in the Bjorne shaft, operated on company account at the Daisy, in the Diamondfield section of the district, averages upward of $100 per ton, and appears in generous proportions. The number of ounces per ton of gold and silver is about equal.—It is the purpose to sink the main working shaft on the Manhattan Rob Roy estate to a depth of 100 feet and at that point to crosscut to contact with the rich ledge making in from the Independence Consolidated ground.—The Hannapah Mining Company, which has been developing its property at Hannapah, about eighteen miles east of Tonopah, for the past five years, closed down last week for lack of funds, and the entire force of fourteen miners and top-men were discharged with three months' wages due.—Manager Weber is taking bids for lumber for the new Sphinx mill at Round Mountain.

CALIFORNIA

Inyo County.—C. E. Barber, of Denver, Colo., has located eight claims on a well defined quartz ledge near Lee, which, he states, carries values, as per assays, of from $1,100 to $4,700 in gold, and ten claims on a strongly mineralized copper ledge eleven feet wide from which samples of native copper run eighty per cent. An option on a nearby water right has been secured which will be used for the operation of a mill soon to be constructed.

Riverside County.—The Five Metals Mining Company have taken over a group of claims near Twenty-nine Palms canyon, formerly owned by P. T. Sullivan. Surface assays show $87 to the ton.

San Bernardino County.—Allen Davison, representing the Sunrise Gold and Copper Company of Los Angeles, reports large quantities of tungsten in the Signal mining district eight miles east of Von Trigger, where the company has fifteen claims.

CANADA

British Columbia.—The Sudbury mine, Deadwood camp, has ceased operations for the winter.—Good ore is in sight in the Croesus, near Anaconda, where preparations are being made for winter work.—At Rossland the mines are being worked as usual with no prospect of a shut down.—The electric drive compressor has been installed at the Crescent mine below Phoenix and about fifteen men will be shortly employed drifting at the bottom of the shaft where high grade silver is in evidence.—The Consolidated Mining and Smelting Company has cut its quarterly dividend in half.

NEW MEXICO

Grant County.—Huston and Venable have discovered eighteen inches of $100 gold and silver ore in a porphyrytic dyke between lime and quartzite in the Woodlawn on Walnut creek.—The Burro Mountain Company is developing its ground with a force of twelve men and running its mill on half time.—The shaft on the Mayflower belonging to Cosgrove and Knucky, is now down eighty feet, at which a crosscut will be made to find the extent of the large ore body that has been encountered.—On the Copper Glance group of claims in the Burros, there is a forty-foot shaft from which twenty tons of ten per cent copper ore have been placed on the dump. The claims are under lease and option to McGregor and Dugan from John Jefford.—Ben Laswell, who recently found a rich lump of copper float in the White Signal section, has located the original vein which has an extreme width of three feet and assays 1.92 ounces of gold and 15.3 per cent. copper for the second class material.—On the Esperanza group west of Fierro a shaft thirty-five feet deep discloses at the bottom a rich body of lead and silver ore four by six feet, the size of the shaft.—The Grand Central mine in the Carpenter district has been examined by experts from Joplin, Mo., who will probably ship machinery from Joplin to install on the property.—J. T. Johnson, a New York capitalist, and Prof. Wm. P. Blake have returned from an examination of the aluminum deposits on the Upper Gila well satisfied with their value and extent.—Meerschaum from the Sapello mines has been tested and shown to be marketable.

Otero County.—The new smelter of the Southwest Smelting and Refining company at Orogrande blew in on November 6th with two shifts of thirty men each, working twelve hours a shift. But one of the two furnaces of 250 tons capacity each have been installed. The other will be secured as soon a sthe ore production of the camp is sufficient.

SOUTH DAKOTA

Custer County.—The Saginaw mine in the vicinity of Custer City has a new hoist installed to replace the one destroyed lately by fire.—The new ten-stamp mill at the Ruberta has been completed.—The payroll at the Mica mines of the Westinghouse company amounts to about $2,500 a month.—The Ivanhoe company has secured the Pontiac, Pontiac No. 1, Ote and Sunrise claims from Charles Upham, the Holden estate, J. F. Baker, Al Fay and Hal Wise for a consideration of $3,000. The group adjoins the Ivanhoe on the north, within a short distance of the new mill.

Lawrence County.—The Great Northern Mining and Milling company, recently organized, will develop the Ballou-Wagner group on the south fork of Sheeptail, consisting of three claims and a fraction on which are fifteen or twenty parallel veins assaying in twenty-six different tests from $2 to $40 in gold. One test yielded $128 in gold.—At the Lucky Strike property on north Box Elder an ore body 260 feet wide has been exposed, eighty feet of which is free milling with values above the average. A new hoist and ten-drill air compressor have been installed. The thirty-stamp mill with a cyanide sands plant and slimes annex will be completed by the first of the year..—The Kicking Horse milling plant in Blacktail gulch is now ready for the machinery. The two-mile pipe line to connect the mill with the cyanide plant in which the sands will be retreated, is now being laid.—A new Ingersoll drill of the Temple pattern carrying its own air compressor and motor is being tested at the Homestake.—Ore running 500 ounces silver and $40 in gold to the ton is reported at the Hattenbach ground adjoining the Iron Hill mine in Carbonate camp.—At the American Eagle north of Portland, sufficient ore is on the dump to keep the new mill in operation which is being rapidly constructed.—The Arkota Mining compony has been obliged by the financial difficulties to suspend operations on its property in the Bear gulch district, where a large hoist was being put in.—At the Gilt Edge-Maid mine and mill operations were resumed on November 27th for the first time since the eight-hour strike last January. Between 100 and 150 tons of ore a day are being taken from the open cut at the mine.—The hoist at the Mogul shaft of the Mogul company at Terry is in commission.

Pennington County.—The Annie mine in Ruby gulch about three and one-half miles northeast of Hill City has been unwatered and will probably receive development at the hands of its owner, S. A. Baxter, of Lima, O.—The Continental Copper company has laid off its force at the Dakota-Calumet copper property and will prospect with a diamond drill to be placed at the 500-foot level, where a large station has been cut.—Klein and Burton have resumed work in the 100-foot O. K.

el near Hill City and will cross- the ledge which is free milling good surface indications.—At the mine the tramway has been com- d.—Owing to the decline in tung- the Black Metal company has ended work on its wolfram ns near Hill City.—The Provident ng company has shipped a carload mblygonite from its mines near stone.—The Mayflower group of claims, northwest of Keystone ed by Hayes Brothers and Hopkins ing developed.

Obituary

illiam J. Whitmire, aged twenty- years, a cousin of William Ran- n Hearst, died in Lead, South Da- last week of typhoid fever. He a popular young man, and came to seven years ago from the Stan- university, where he graduated. a time after locating in Lead he in charge of the memorial li- y established there by Mrs. Phoebe st of New York. Later he went the employ of the Homestake Min- Company, finally becoming fore- of the cyanide plant No. 1, which ion he held at his death. The re- ns were taken by his mother to the ly home in San Jose, California, nterment.

enry O. Havemeyer, the noted r king, died at his home, Commax, Island, Wednesday the 4th inst. was president of the American ar Refining Company and was in ver only a few weeks ago in the est of his extensive holdings in northern part of the state—the t Western Sugar Company, own- all the sugar factories in northern rado. Mr. Havemeyer was born ew York City in 1847, and was but more than sixty years of age at ime of his death. His company is alized at $75,000,000, and controls sugar interests of the United es. He was president and director e American Coffee company, direc- f the National City Bank, director he Alliance Realty Company, of Central Realty, Bond & Trust Com- , New Jersey & New York Realty provement Company, and trustee he Colonial Trust Company. His ence is at Greenwich, Connecticut. ral years ago he presented the a public school house costing ,000.

was a large fine looking man and n here a short time ago we thought good for twenty years more of e life. His wealth is estimated at 00,000.

Major Jacob Downing died at his home in this city last Sunday morning at the age of seventy-eight years. During the war he was a brave and distinguished soldier, and all his manhood days he had led an active and useful life. Major Downing was mustered into the army as captain of Company D, First Colorado Cavalry in 1861, and was mustered out as major in 1865. He was first and foremost in all the battles of the regiment, Indian campaigns, long marches and rough bivouacs in this, at that time, wild and turbulent occidental region. At the battle of Cedar Canon, 150 miles northeast of Denver, the writer saw his horse shot from under him by an Indian, who was 500 yards distant. In that fight we lost but one man, Isner, who had the spine of his neck cut off by an Indian bullet. Out of a village of fifty Indians only three made their escape. The trouble was finally settled at Sand Creek in January, 1865, where the backbone of the whole Cheyenne nation was broken. Five hundred of them were wiped from the face of the earth. The writer was with Major Downing in all these campaigns and knew him to be a cool, capable and fearless soldier. In private life he was a man of great energy and ability and he had an abiding faith in Denver, the city of his adoption and the Centennial state he helped to make. Later in life he became very wealthy and died in the fullness of his years crowned with honors. He is survived by Mrs. Downing, the widow, and a sister, Mrs. I. A. Rosecrans, of New York, both of whom were at his bedside when he passed away. There is a brother, William Downing, residing in Peoria, Illinois, and other relatives in the East.

Personal

James M. Brinson, city attorney of Cripple Creek, returned from the Transmississippi Congress, which was held last week at Muskogee, Oklahoma. Mr. Brinson said Denver would have secured the next congress had it not been for the pathetic appeal put forth in behalf of San Francisco on account of her recent earthquake and fire calamity. Thomas F. Walsh of Denver was named for the chairmanship of the executive committee.

Eugene Lovenberg, the New York representative of the Denver & Rio Grande railroad, has been in the city during the past week. He says there is no great excitement in the East over the recent financial flutter. Business does not appear to be hard hit and the crisis has slid into the past without an earthquake. Mr. Lovenberg says that the exodus of aliens for their homes in Europe has been heavier in the past forty days than ever before in the history of the country. This has been brought about by the discharge of thousands of foreigners by railroads and other large corporations anticipating a more serious financial state of affairs than we have actually had.

Percy Williams, who graduated from the State School of Mines at Golden fifteen years ago, is now a prominent mining engineer at Tucson, Arizona. He was examining properties in British Columbia the early part of the month. For several years after his graduation he was located at Silverton, this state.

If John Hays Hammond should ever receive the salary reputed to him by a lot of sensational publications, he would be the most surprised engineer that ever lived. Think of $500,000 a year, who wouldn't be a mining engineer?

J. H. MacKenzie, has been appointed general manager of the properties of the Goldfield Consolidated Mines Company, Goldfield, Nevada, succeeding John W. Finch who has been promoted to the position of consulting engineer of the company.

A. D. Parker, a prominent railroad man, heavily interested in a rich gold mine at Goldfield, Nevada, has just returned from that noted camp. He says the money stringency and labor troubles have checked operations there temporarily, but the mine operators are plucky and propose to fight it out on the line they have laid down, if it takes all winter.

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Discussion and Opinion

Our Readers are Cordially Invited to Use This Department for Making Inquiries or Giving Publicity to Their Ideas

Against the Suspension of Assessment Work

A great deal of publicity has been given in the papers throughout the country of late, and more especially the western publications, to a question of considerable moment at this time and one that at first thought would suggest itself as being a one-sided question.

The proposition to introduce in the approaching session of Congress a bill to suspend the annual assessment work on all mining claims for the year 1907 is one that is likely to be a far greater detriment to the country in general and the legitimate mining men and prospectors as a whole than it would be of benefit to the few, and the conditions existent in the country do not, in my judgment, justify any such action.

Some parties advocating the proposition give one of their reasons for its adoption that it was resorted to in 1893, claiming that the conditions at the present time and of that period are similar, when in reality there is no justification whatever for the assertion as the conditions are in no wise parallel.

In 1893 the crisis came in July and the results were such that there was a great depression in the value of all property, large amounts of money were lost through failures of banks, laborers quite generally were thrown out of employment and those conditions continued for a long period; whereas this year wages throughout the country have been high and miners who were willing to work could readily find employment up to the first of November, during which time a very large proportion of the work had already been done on the properties held by legitimate prospectors or miners, and even if it had not been and they had the money in the banks to their credit, a check on the bank would pay for it, as the loss through the failures of banks would affect very few prospectors or miners holding claims on which the assessment work was not completed.

On the other hand, the suspension of the assessment work for the year 1907 throughout the entire mining region would be of far more detriment to the mining industry than the present stringent conditions themselves have been. The fact of the matter is that it would almost entirely redound to the advantage of a few speculators who take advantage of the work and capital invested of the miners themselves to the detriment of the whole mining industry.

During the past year I have had occasion to visit a large number of the most prominent mining camps of Utah, Nevada and southern California, where the new development has taken place, and when a new field is opened up the results are practically the same, so to illustrate the general conditions existing throughout the mining region will give one particular instance that is a fair illustration of all.

I had occasion to visit Granite mountain, located about half way between Cobre and Ely in Nevada, and found that the construction of the railroad between these two points something over a year ago, which passed close to Granite mountain, made that section available for mining, and during the last year a few energetic prospectors went in there, located a few claims and immediately prosecuted their development with such favorable results that it enabled them to begin sacking ore of a sufficient value to be shipped at a profit before they had developed their ground to more than from 20 to 25 feet. The news of these strikes soon spread to the larger mining camps, with a result that many speculators sent men to that field to locate the ground in and around where the strikes had been made; in some instances locating as high as a hundred claims, on which there is not one in ten where the legal ten-foot hole was sunk. In fact, this fever spread during the months of November and December of 1906, so that the ground to the extent of many miles was staked out, and then the work on the part of these people was suspended waiting for some one to come along who wanted to actually go to mining to pay them a big price for their locations, and in some cases they accomplished their purpose, and up to the present time work on a very large percentage of that ground still remains undone.

Should the assessment for this year be suspended, all of that vast extent of country will be tied up, but if it is not these people will be compelled to do their own assessment work or give way to others to take up the ground and go on with its development without being held up for an exorbitant price for an undeveloped claim. Not only is this true of Nevada but the territory of Arizona is even perhaps a more striking example. I personally know of instances where parties have as high as eighty or one hundred claims staked on which they never could and never intend to do their legal work. These claims in general are held by men of no means who simply obstruct the legitimate investor and prevent the actual prosecution of development work and mining. This is a fair illustration of the conditions existing throughout the mining region and especially so in the new fields of operation. FRANK A. SMITH.

AMERICAN ZINC AND LEAD SMELTING COMPANY.

The American Zinc, Lead and Smelting Company for the first six months of this year earned profits of $215,000. Out of this there was charged off $50,000 for depreciation of smelters and $24,000 for mine development, a total of $54,000, leaving net profits of $161,000 equal to $2 per share for the 80,000 shares of outstanding stock for the six months. At that time the company was paying dividends at the rate of $3 per annum in quarterly disbursements of 50 cents per share regular and 25 cents per share extra.

It is understood that for the month of October the company earned $26,000 net and even at this reduced rate the company should earn about $300,000 per annum before any depreciation charge is made.

The company, in its last quarterly dividend disbursement, declared only the regular dividend of 50 cents, leaving off the extra 25 cents, so that the stock is now on a $2 per annum dividend basis.

The continuation of such a dividend will call for but $160,000 per anum. There is every reason to believe that this rate can be maintained even under the abnormal conditions now existing in the Joplin zinc district. At the present time the mine end is the best paying part of the business. On November the mines earned $15,000, and in November the smelter $11,000. Heretofore the smelting end has been the most profitable. The company has the most modern smelting plants in the Joplin district, and has an unfailing gas supply sufficient for its needs for years to come.

MACHINERY AND EQUIPMENT

Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.

Typical Mexican Burro Loaded With Cameron Pumps.

METHOD OF TRANSPORTING MINING MACHINERY IN MOUNTAINOUS COUNTRIES.

By H. H. Kress.

American capital is being constantly invested in the many promising enterprises throughout Mexico, Central and South America. Only recently the United States consul general of Mexico estimated that during the last four years $125,000,000 of American capital had been invested in the mines of Mexico alone, while in other industries the investments are also very large; which is also true of the other countries referred to.

The greatest percentage of capital, however, is invested in the mining industry; as indeed it was owing to the discovery of precious metals in the various parts of these countries that led settlers to discover the other resources; thus, new settlements, mining camps and towns were created and are rapidly growing with the new industries.

In the development of all of these industries there is a constant demand for new machinery and equipment, and the larger portion is being supplied by American manufacturers. In the interior and in the mountainous districts there are still a larger number of mining camps with close railroad facilities; and in some places, the settlements are many miles from a railroad station.

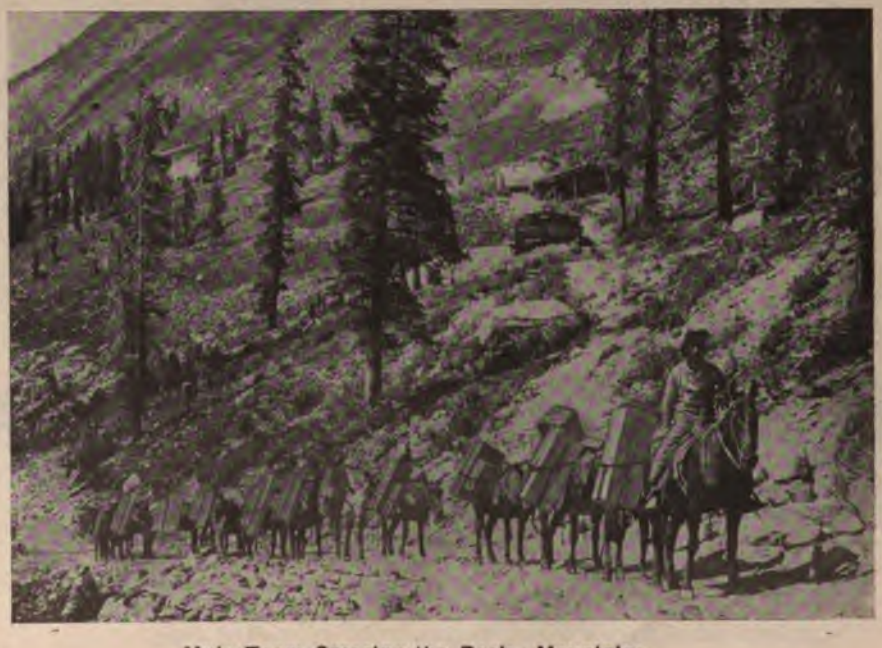
The transportation facilities are very costly and the methods, in many places, are very crude; in some parts the transportation of merchants and machinery is carried on by the use of ox carts; although in western Mexico, where the mining industry is extensive the Mexican burro or donkey is a most important factor, and is preferred on account of its being a swifter carrier and safer in the dangerous mountain passes.

Thus the traffic between the railroad stations and the interior points is very largely handled by burro transportation. These little animals are worth from $12.50 to $20 each, United States currency. They average about 500 lbs. in weight and will carry weights up to 300 lbs., traveling from twenty to forty miles per day, according to the condition of the country.

The class of machinery used in these mining countries is often specially built to suit the mode of transportation, and in order to transport by mule teams must be designed and built to allow for dismantling so as to form a load of moderate weight for these animals to carry.

We are showing herein, by courtesy of the A. S. Cameron Steam Pump Works, several photographic reproductions of mule teams loaded with sectionalized Cameron pumps; also illustrations of these pumps as they appear when put together. These designs of pumps have been adopted almost exclusively for the mountainous regions, and have found their way on mule-back and sometimes by more primitive modes of transportation, over the mountain passes and terraced ranges of our own country and old Mexico, Columbia, Peru and Chili, as well as into other mining regions of Central and South America.

These types of Cameron mine pumps are built for the heavy work and rough service which they are usually subjected to in mining work. They are built in sections, the parts being so designed and proportioned that the



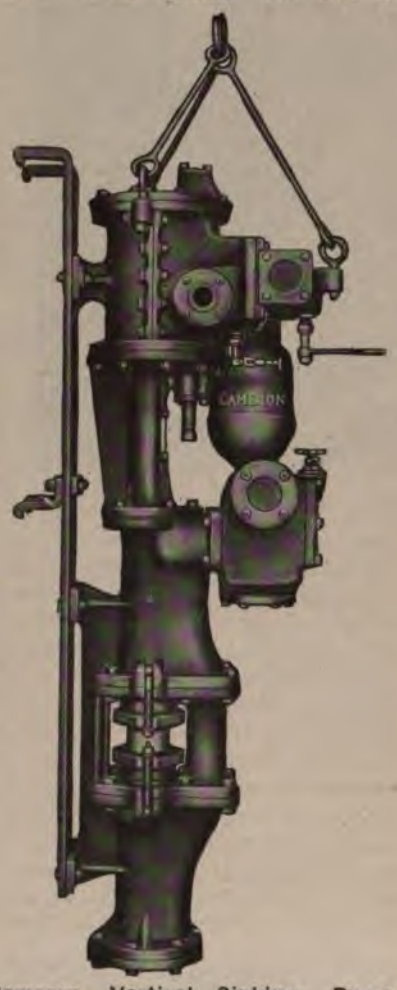
Mule Team Crossing the Rocky Mountains.

pumps can be taken apart at the bolted joints and packed for shipment. The majority of pieces weigh less than 150 lbs., while the maximum weight, 300 lbs., is rarely found, and only in the larger sizes. The parts are so arranged and marked that they can be readily assembled and the pump set up without the aid of a skilled mechanic; and every pump that leaves the Cameron works in New York City, is thoroughly tested to a degree far in excess of its rated capacity.

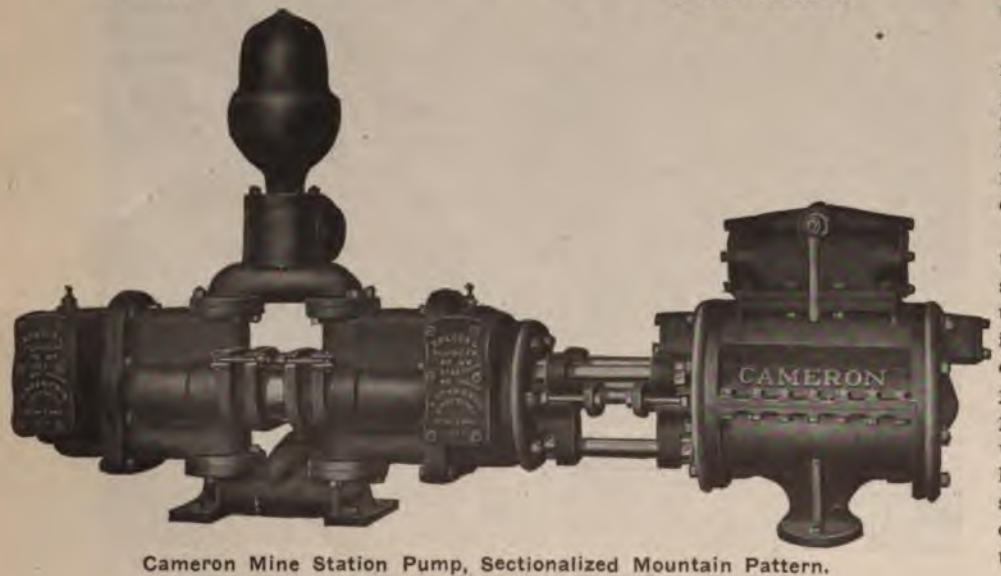
The Cameron shipments from New York, destined for long journeys, are arranged for convenient handling and strongly and securely boxed, on account of the numerous transfers of frieght in steamship and railroad traffic before they reach their ultimate destination. The arrangements for mule-back transportation must usually be made at some convenient station on the line of a railroad or other carrier, the cost for transporting the material by burro train varying in proportion to the distance to be traversed, scarcity of animals and the character and conditions of the country. Where the mountain passes to be traversed are narrow and dangerous, the loads are lightened as much as possible; oftentimes the boxes may be discarded and the machinery fastened on the back of the mule or carried in bags. It is sometimes necessary, when crossing steep and narrow mountain passes, to strap sticks to both sides of two mules and place the load between the two.

The burro is also an important factor in connection with the mining industry as an ore carrier, and burro trains are loaded up at the mines for return trips, thus taking material to and fro, the ore being held in leather pouches or bags.

The legislature of Michigan has repealed the law which limited the land holdings of mining companies to 50,000 acres.



Cameron Vertical Sinking Pump, Sierras Pattern.



Cameron Mine Station Pump, Sectionalized Mountain Pattern.

THE HOUSE OF HOEGEE.

The house of Hoegee was born in the city of Los Angeles in the Golden State about seventeen years ago. At that time only tents and awnings were made and business was conducted in a modest manner. There are several Hoegees in the Angel City, but the house of Hoegee under the firm name and style of The William H. Hoegee meant in this article. The tent and awning business grew, increased and expanded as the years passed on, until today the business occupies an immense structure on Main street about 60×350 feet and four stories high. The structure sweeps back to Los Angeles street and is a beehive of industry. More than 200 people are employed and everything is sold from a needle to an anchor, and a celluloid button to a circus tent. Thousands of people swarm in and about the place daily and system marks every movement from the advertising department, under the direction of Mr. John C. Hill, a keen-eyed, pleasant-faced man, to the managers of the wholesale and retail departments. Orders come to this house from all parts of the world and tons of goods are constantly being shipped to outside states and distant lands. It is wonderful how the tact, energy and persistence of Yankee enterprise progresses. At the managing head of this vast concern is a general. He is a young man about twenty-five years of age, keen as a brier, smooth-shaven, bright-eyed, with intelligence indelibly marked on every feature. He has very little to say but he has the perseverance of a Grant, the diplomacy of a Bismarck and the grace of a Castilian. Such is the picture of Mr. Adolph Hartmann. By all his employes he is liked and the business people of Los Angeles know that his word is gold.

Quiet and unassuming, he has built up a vast trade that supplies homes, ships, mining camps and business places with everything known or needed.

The main success of this great establishment can be traced, perhaps, to extensive and judicious advertising, strict attention to business, meeting the wants of its patrons, selling goods on close margins, integrity and a high sense of honor in all its transactions.

Every letter is answered, whether from a millionaire or a humble prospector. Politeness and a we-make-you-feel-at-home condition abounds, and never a scowl is seen on the face of a man or woman connected with the concern.

The business of this house continues to grow and there is no reason why it should not. Here you can always obtain what you want, no matter what it may be. In Los Angeles you can call if you wish. In far-away places you can write for what you desire and you will get it. A postal card is always honored if addressed to The William H. Hoegee Company, 138 Main street, Los Angeles, California. The catalogues of this house, many of them, read like tales from the Arabian

Nights and would do credit as center-table ornaments or a Christmas present. A postal card will bring one.

All the tents, awnings, fumigating and circus tents, miners' clothing, uniforms, society goods, badges, gun cases, sword scabbards, clothing, flags, banners, dog-collars and a thousand other things, are manufactured under the same roof that covers this gigantic concern, and sold direct to their customers. We could say more but space forbids.

ANOTHER MANUFACTURER OF BIG GAS ENGINES.

As an indication of the rapid development in the manufacture of big gas engines and the importance of the field occupied by this type of prime mover, it is of interest to note that another manufacturer of large Corliss Steam engines has actively taken up the manufacture of gas engines, and is bidding strongly for engines in medium and large sizes.

The Wisconsin Engine Company, with works at Corliss, Wis., which has built some very large and successful Corliss steam engines, is building gas engines for all services in sizes from 400 B. H. P. to 5,000 B. H. P. The engines utilize natural gas, producer gas, coke-oven gas or blast-furnace gas in the Otto cycle (4-cycle), and are of the horizontal tandem and twin-tandem double-acting type. This company controls the Sargent patents of internal combustion engines and has employed Mr. Charles E. Sargent as the engineer of its gas department. Mr. Sargent has a wide reputation as an engineer and in 1898 designed the first horizontal tandem double-acting gas engine, which was a wide departure from the accepted practice of those days, when the most prominent manufacturers of gas engines declared such a type was impracticable, and doomed to failure. However, the largest and most successful gas engines are of the horizontal twin-tandem double-acting 4-cycle type, and with one exception this is the only type in which large units are being built in this country today.

The gas engines built by the Wisconsin Engine Company bear some of the distinctive features of their big Corliss engines, and utilize in design most of the Sargent patents. The design is remarkably simple and embodies features which are of considerable interest to the engineer and power user—e. g., there is but one poppet valve for each explosion chamber, and as this is located on the bottom of the cylinder the cumbersome and unsightly air and gas pipes, as well as the stairs, galleries, and railings found on most horizontal tandem engines, are entirely eliminated; provision is made for preventing the dangerous pressures caused by possible pre-ignitions; and the engines are started automatically.

Tests of even small Sargent engines show a heat consumption of less than 9,000 British thermal units per brake horse power hour.

This company has recently shipped some large steam engines to such concerns as the Illinois Steel Co., Jones & Laughlin Steel Co., Packard Motor Car Co., American Sheet & Tin Plate Co., Amoskeag, Mfg. Co., New Hampshire Spinning Mills, National Tube Co., City of Milwaukee, Carnegie Steel Co., American Woolen Co., United States Envelope Co. and the Carnegie Natural Gas Co., and has built up an unusual reputation for shipping "on time." It promises to do as well on gas engine orders.

Works of the Wisconsin Engine Co., Corliss, Wisconsin.

FINANCING COPPER.

The position of the large copper selling agencies and copper producers who have sold copper abroad over the last two months will be materially strengthened next month as a result of payments falling due on these shipments.

Most of the copper purchased by Europe in October and November called for delivery in December and January. According to a prominent producer payment will be made for at least two-thirds of this copper next month. As copper exports for the months of October and November will aggregate more than 175,000,000 pounds the amount of money involved will be large.

At 14 cents a pound these shipments would represent a valuation of nearly $25,000,000. The payments on this copper will not only strengthen the position of producers and sellers of copper, but also result in the paying off of large loans on copper on this side.

Our St. Louis Representative

We take pleasure in announcing that we have appointed J. William Stewart, Globe-Democrat building, St. Louis, Missouri, as our agent and representative in St. Louis. Any favors shown our agent by our patrons present and prospective will be appreciated by the management.

Should magnesia be present in boiler feed water it may be detected by boiling a sample of the water in a test tube, and adding a small quantity of carbonate of ammonia and phosphate of soda. Magnesia forms a white precipitate.

THE STOCK AND METAL MARKETS

Colorado Springs

Dec. 5.—El Paso advanced 25¼ on the exchange Monday. The cause being the acquiring of the stock by J. F. Burns, which was formerly held by A. L. Burris took the stock because Burris was unable to furnish further collateral in view of the recent decline in the value of the security. This gives Burns a total of 140,000 shares, and makes him the largest individual stockholder in El Paso.

As a result of the coup 72,000 shares of El Paso changed hands, stimulating the market to a great extent. In the opinion of mining men this ends the fight against Bernard as far as Burris is concerned.

On Tuesday it was announced that Mr. Burris would secure the stock again by paying the amount of the loan, $20,000, for which he put up the stock as collateral and interest to date. It is understood it will cost Burris $21,000 to secure the stock again.

It is evident from the recent developments that Burris and Burns are not working together to oust Bernard, as was at first rumored. S. S. Bernard against whom Burris is making the fight is silent and his friends claim he is not worried over the situation in El Paso.

Trading on Wednesday on the exchange was light with a few shares changing hands.

Following were the closing quotations and sales on mining stocks today:

Stock.	Bid.
Acacia	05½
Black Bell	02
C. C. Cons.	03
C. K. & N.	05
Dante	05¼
Dr. Jack Pot	05⅞
Elkton	46
El Paso	26
Fanny Raw	05½
Findley Cons.	35
Gold Soverign	04
Gold Dollar	06
Index	02
Isabella	21
Jack Pot	03⅝
Last Dollar	02
Lexington	....
Mary Cashen	....
M. McKinney	25
Old Gold	03
Pharmacist	02¼
Portland	93
Vindicator	75
Work	15¾

Unlisted.

Golden Cycle	40
Jennie Sample	....
Jerry Johnson	05
Un. Gold Mines	04

Prospects.

Stocks.	Bid.
Agnes	....
Aola	....
Banner	01
Blue Bell	02
Bob Lee	005
Buckhorn	006b
C. C. & M.	005
Des Moines	....
Gold Bond	02
Gould	....
Hart	....
Ida May	01
Jolly Jane	005
Keystone	....
Little Bessie	....
Litle Nell	009
Little Puck	....
Mary Nevin	01¼
Missouri	005
Mountain Beauty	05
National	0075
New Haven	005
Pilgrim Cons.	01
Pointer	....
Princess	003
Raven & B. H.	....
Republic	0075
Requa Savage	03
Rose Nicol	01¼
St. Thomas	01
Teutonic	....

New York

Dec. 5.—American Smelting took an upward tendency since our last week's quotations, gaining 10 points. Colorado Fuel & Iron is much better this week, rising from 16 to 20¾. The same is noted in many other stocks. This we take as a good omen of the close of the money stringency and the quick resumption of property.

The suspension of the National Bank of Commerce in Kansas City had little or no effect in general financial affairs.

Henry R. Murton & Co., Ltd., the London correspondent of the American Metal Company, says: "There is abundant evidence that copper at its present level is causing a more extensive employment of the metal, and that a further reduction in prices would induce many people to take in supplies. Trade in Europe, in spite of all adverse circumstances, would appear to be quite satisfactory, and in addition to orders given out during the past few weeks, plenty more are in view.

"The large stocks in producers' hands have been very materially reduced and the output curtailed so that producers can be more independent than of late.

"A certain quantity of the surplus is finding its way into European warehouses, and the available stocks for the purposes of transactions in the London market will soon be increased.

"English standard copper which has for a long time been the main source of our market, has been almost taken out for consumption and the stock of Chili bars is all bespoken."

Following are the quotations:

Stock.	Bid.
Amal. Copper Co.	49¼
Amer. Smt. & Ref. Co.	75⅞
Amer. Smt. & Ref. Co, pfd.	92
Anaconda Copper Co.	32
National Lead Co.	43¾
Newhouse M. & S.	6⅞
Utah Copper	17
U. S. Reduction.	05
U. S. Reduction, prfd.	23
Colo. Fuel & Iron	20¾
Anaconda Copper.	32
Republic Steel.	17½
Republic Steel, pfd.	69¼
General Electric.	1.17½

Curbs.

Stock.	Bid.
Arizona Commercial.	11.62½
Ahmeek.	50.00
Black Mountain.	4.00
Cumberland Ely.	5.37½
Davis-Daly.	4.12½
Ely Cons Copper.	.62½
Empire Copper.	1.50
Giroux	3.00
Greene-Cananea Copper.	5.75
Greene Gold-Silver.	.50
Globe Cons Copper.	5.25
King Edward.	.62½
Keweenaw.	5.00
Mitchell.	.62½
Nevada Utah.	2.62½
Nevada Cons.	8.00
Nipissing.	6.50
Superior & Pittsburg.	8.87½
Silver Leaf.	8.00
Shattuck.	16.00
Tintic.	2.75
Utah Apex.	2.62½
Wolverine Arizona.	2.25
Carisa	.13
Ely-Giroux Ext.	1.00
Butte & London.	.75
Domino Copper.	1.75
Majestic.	.78
Newhouse M. & S.	6.87½

Boston

Following are the quotations:

*Stock.	Bid.
Adventure.	1.75
Arcadian.	4.25

ez	27.50
tic.	9.75
ıam.	4.75
Cns.	10.75
;ala.	2.50
Coalition	15.00
net & Hecla.	....
net & Arizona	98.00
ennial.	26.50
er Range	55.00
West.	10.25
klin.	8.00
by.	70.00
Royale	17.37½
alle.	11.00
	2.62½
igan.	8.75
ıwk.	....
ı Butte.	40.75
Dominion	27.50
ola.	85.00
ot.	10.00
cy.	79.00
non.	10.25
ıarack.	64.00
ty.	15.00
d Copper.	7.50
Smelting.	38.00
Smelting pfd.	38.00
Cons.	32.50
ria.	4.75
na.	4.00
ıdot.	.70
erine.	110.00

tis & Hough.

Nevada

ceived over the private wire of Malo & Co., 221-223 Boston Bldg. ı Francisco, Cal., Dec. 5.—Follow- ere the closing quotations on min- tocks today:

Comstock.

ock.	Bid.
	1.22½
can.	30
Virginia.	27
ge.	27
w Jacket.	1.52
ıer.	17
a Nevada	31
equer.	....
n.	....

Tonopah.

ock.	Bid.
pah of Nevada.	6.12½
ana Tonopah.	1.40
pah Extension.	1.05
Kamara.	16
ray.	40
pah Belmont	87
pah North Star	08
Tonopah.	....
End Cons.	34
ue.	....
en Anchor.	03
Butler.	42
Boy.	....
e.	....
ırch Pittsburg Ext.	01

Goldfield.

Stock.	Bid
Sandstorm.	18
Columbia Mountain	14
Jumbo Ext.	50
Vernal.	06
Pennsylvania.	....
Kendall.	10
Booth	16
Blue Bull	15
Adams.	06
Silver Pick.	22
Nevada Boy	02
Black Butte Extension.	04
Blue Bell.	06
Dixie.	03
Goldfield Columbia.	08
Hibernia.	02
St. Ives.	37
Conqueror.	04
Black Rock.	02
Lone Star.	07
Goldfield Wonder	.....
Potlatch.	....
Oro.	08
Kendall Extension.	....
Sandstorm Extension.	....
Mayne	....
Atlanta.	21
Great Bend.	23
Simmerone.	03
Empire.	05
Red Top Extension.	09
Florence.	2.82½
Diamondfield B. B. Cons.	15
Goldfield Daisy.	67
Commonwealth.	....
Combination Fraction.	73
Great Bend Extension	05
Great Bend Annex	03
Black Butte Bonanza	....
Kewanos.	....
Esmeralda.	....
Portland.	06
Crackerjack.	....
Red Hills	25
Mohawk Extension.	....
Lou Dillon.	04
Yellow Tiger.	....
Grandma.	05
Silver Pick Extension.	02
Yellow Rose.	02
Columbia Mountain Ext.	....
Goldfield Cons.	3.72½
Diamondfield Triangle.	06
Coming Nation.	....

Bullfrog.

Stock.	Bid.
Original.	03
Bullfrog Mining.	04
Montana Bullfrog.	....
National Bank.	09
Lige Harris.	....
Amethyst.	05
Gold Bar	30
Denver Bullfrog Annex	....
Bonnie Clare	....
Mayflower Cons.	15
Montgomery-Shoshone Ext	03
Golden Sceptre.	03
Montgomery Mountain.	05
Bullfrog Diamondfield	03
Homestake Cons.	55
Yankee Girl.	....
Tramp Cons.	16
Banner.	02

Manhattan.

Stock.	Bid.
Manhattan Cons.	25
Manhattan M Co.	03
Gold Wedge.	03
Seyler-Humphrey.	02
Dexter.	....
Little Joe.	....
Crescent.	01
Combination.	01
Mustang.	11
Cowboy.	01
Broncho.	03
Jumping Jack.	....
Pinenut	03
Buffalo.	....
Stray Dog.	09
Yellow Horse.	02
Indian Camp.	05

Other Districts.

Stock.	Bid.
Fairview Silver King	....
Fairview Eagle.	51
Nevada Hills.	3.00
Pittsburg Silver Peak.	1.00
North Star Wonder	02
Eagle's Nest	25
Alice of Wonder	....

Salt Lake City

Salt Lake City, Utah, Dec. 5.—Following were the closing quotations on mining stocks today:

Stock.	Bid.
Alice.	....
Ajax.	27
Butler-Liberal.	04
Bullion Beck.	....
Beck Tunnel.	58
Black Jack.	31
Colorado.	2.57½
Carisa.	20
Columbus Cons.	2.20
Cons. Mercur.	20
Daly Mining.	....
Daly-Judge.	4.25
Eagle and Blue Bell	....
Grand Central.	2.50
Ingot.	02
Lower Mammoth.	57
Little Chief.	04
Mammoth.	1.75
May Day.	36
Nail Driver.	....
New York.	06
Mountain Lake	28
Ontario.	2.25
Ohio Copper.	2.50
Nevada Hills.	3.00
Standard Copper.	20
Sacramento.	03½
Silver Shield.	03
South Swansea.	04
Swansea.	20
South Columbus Cons.	66

Tetro.	02
Uncle Sam.	53
Utah Mining.	1.47½
Victoria.	....
Victor.	05
Yankee.	....
Iron Blossom.	26
Sioux Cons.	18½
Crown Point.	17
Seven Troughs.	39½

*Otis & Hough.

Metal Quotations.

Bar silver	$ .57¾
Lead, St. Louis	4.00
Spelter, 100 lbs., St. Louis	4.40
Copper, casting brand	13.12½

THE CURRENCY SITUATION

Mann, Bill & Ware say regarding the currency situation:

"The market on currency has been steadily diminishing in volume for the last few days, and unless some unforeseen bad news should come out we expect the premium will disappear within a week.

"We began dealing in currency at the instance of the banks and safe deposit companies, who early realized the widespread extent of the hoarding, and we were among the first to advertise a premium to draw into circulation again the hidden money. The offering of the premium by dealers has undoubtedly been the means of restoring to banks' deposits many millions of hoarded currency and it has had the effect of distributing the released money to those points where it was most needed.

"We have in every instance refused to purchase money that was forced under pressure from bank deposits and believe that other dealers have acted in the same way.

"The demand has come from corporations for payrolls, from importers requiring gold for custom duties, and from banks and other institutions desiring larger reserves. The last source of demand seems to be the most persistent, and particularly from institutions in the West and South. This would seem to indicate that the main reason of the continuance of the premium is now not so much the hoarding tendency of the public, as it is the blockaded and immovable condition of the money market between various centers. Payments by check 'through the New York Clearing House' are useful for local settlement, but not for payment on non-local debts."

WESTINGHOUSE ELECTRIC

Pittsburg.—The New York creditors of the Westinghouse Electric Company have agreed to the second plan to take the company out of the receivers' hands, and it will be submitted to the local creditors. The first plan was acceptable here, but not in New York.

Corporation Affairs and Finances

United States Treasury.

Fiscal year 1907-8:

	Dec. 2	This Mo.
Receipts.	$2,131,888	$2,131,888
Expenditures. . . .	2,400,000	2,400,000
Deficit.	$268,112	$268,112

Fiscal year 1906-7:

Receipts.	$1,312,664	$1,312,664
Expenditures . . .	2,530,000	2,530,000
Deficit.	$1,217,336	$1,217,336

	Dec. 2, '07	Nov. 2, '07
Avail. cash . .	$245,535,266	$237,818,516
Of which in banks.	236,550,747	220,926,662

National bank notes received for current redemption: This day, $543,904; this month, $543,904; fiscal year, $95,950,288; national bank notes awaiting redemption, $7,229,271; five per cent. redemption fund, $24,324,877.

New York Sub-Treasury.

	Paid to Banks	Received Fr'm B'nks
November 30 . .	$ 3,466,000	$4,080,000
Since Friday . . .	10,908,000	9,974,000

The Sub-Treasury was creditor at the clearing house on Monday $476,192. There were no extraordinary items. The banks have gained from the Sub-Treasury since Friday $934,000, and for the same period the Sub-Treasury was creditor at the clearing house $666,275.

Boston Bank Statement.

	Nov. 30, '07	Dec. 1, '06
Loans.	$190,718,000	$186,559,000
Circulation. .	8,818,000	8,570,000
Deposits. . . .	138,381,000	44,248,000
Due to banks	68,374,000	62,939,000
Loan certificates* . . .	11,995,000	
U.S. deposits	5,373,000	3,571,000
Reserve agts	24,800,000	26,696,000
Exchange . . . clearings .	11,006,000	15,373,000
Due from banks. . . .	33,191,000	21,179,000
Five per cent. fund. . . .	444,750	433,250
Leg'l tend . .	2,847,000	5,116,000
Specie.	14,316,000	17,026,000
Surplus (deficit). . . .	2,262,571	1,826,857
Surp. in N.Y.	5,374,429	6,380,857

*This should include all loan certificates on hand at the close of business Saturday.

Boston Money Market.

Boston—Every day seems to show a betterment of financial conditions. Every indication is that the end of the partial suspension of cash payments by the country's banks is near at hand. Boston money brokers say there is a considerably greater disposition to put out money. Sales of commercial paper are being made to Western interests, to institutions in New York state and to country banks throughout New England.

There is practically nothing doing in the Eastern cities as yet. One leading note brokerage house was sold paper from 8@8½ per cent. Call money still ranges from 8@10 per cent.

Butte Copper Production.

Boston—The estimated production of the Butte camp during the month of November was 8,256,000 pounds of refined copper. This compares with an estimated output of 8,376,200 pounds for October, 11,329,800 pounds for September, and 23,127,240 pounds for August, and is the smallest month's total this year.

During the month, the mines of Butte Coalition completely suspended production except for a slight output in the course of development. Trenton and Parrot have also completely suspended. The miscellaneous producers have been entirely shut out by the refusal of the smelter to purchase ore.

The only other changes of importance were the practical doubling of Boston and Montana daily copper production and the resumption of operations by Pittsburg and Montana.

The November production was but 31 per cent. of the output during November, 1906, while for the first eleven months of the year the Butte outputs show a decrease from the same period of 1906 to 102,535,447 pounds, or 30 per cent.

The monthly record compares with the previous year as follows:

	1907	1906
First 6 months.	154,447,612	182,845,430
July	27,157,395	32,376,970
August	23,127,240	34,057,03[illegible]
September	11,329,800	29,456,520
October	8,376,200	28,893,240
November	8,256,000	26,600,500
Total	232,694,247	335,229,694

The daily record of the Butte mines in detail showing tons of ore mined daily, pounds of copper per ton, and tons of copper produced every twenty-four hours, is approximately as follows:

	Tons ore St'p'd daily	Lbs. copper per ton ore	Total lbs., copper Prod. daily
Anaconda	1,125	75	84,375
Boston & Montana. .	1,000	80	80,000
Parrot	150	60	9,000
Butte & Boston	150	65	9,750
Washoe	100	72	7,200
North Butte	275	100	37,500
Butte Coalition	50	80	4,000

Denver Bank Clearings.

	1907	1906
Dec. 2	$1,532,605,42	$1,564,925.91
Dec. 3	1,541,349.52	1,509,622.25
Dec. 4	1,123,199.07	1,375,530.32
Dec. 5	1,196,097.32	1,580 '29.64

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MINES AND MINING

FOURTEENTH YEAR WEEKLY

Vol. 15 1824 CURTIS STREET, DENVER, COLO. No. 11

Scientific American 12 361 Broadway 93

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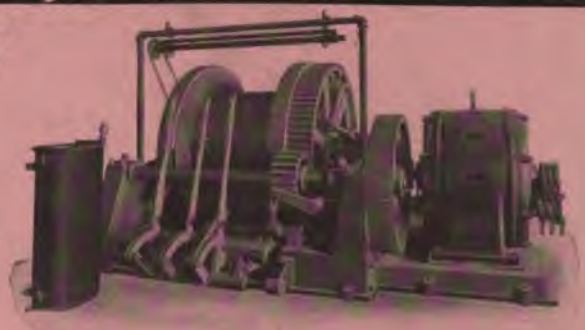

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MINES AND MINING

WEEKLY

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MINES AND MINING

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C. L. HALL.....Editor

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We will be pleased to publish any correspondence relating to mining, milling, metallurgy and kindred subjects, or sharp, clear photographic sketches pertaining to improved machinery, new inventions, mines, mills, smelters, or of any other branch of the mining industry. As a matter of protection and good faith, name and address must accompany such communication.

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To Prevent a Fuel Famine

An Omaha, Neb., dispatch of December 2d says: "It is now possible to see the effects of the efforts made by the northwestern railroads to prevent another fuel scarcity. All during the summer and fall the transcontinental railroads have been carrying coal to the West. There it has been stored in enormous quantities, in the hope that thus a coal famine will be averted. Though there are rich deposits of coal in western states, it was almost impossible to get miners to work them until the closing of metal mines sent the men into the coal regions.

"The Union Pacific and its allied lines, last spring, began to make preparations for the shortage which seemed to be inevitable. Hundreds of thousands of tons have been stored at Omaha, Council Bluffs, Grand Island, North Platte, on the Union Pacific, and at many points on the Oregon Short Line, Oregon Railroad and Navigation Company and Southern Pacific lines. There has been a heavy movement of commercial coal from Utah and Illinois under the low emergency rates offered by these lines. The use of oil as fuel, begun on a small scale, will eventually alleviate the situation considerably.

"In May circulars were sent to all Harriman line freight agents, urging them to impress upon their several localities the necessity of laying up a large supply during the summer or "off" months. The company offered to store, at its own expense, all the coal the mines could spare in order to permit as large a quantity as possible to be devoted to commercial purposes during the fall and winter. A detailed record has been kept of the results of these efforts so that the responsibility for another fuel scarcity can be placed.

"At the same time, the Harriman roads have been making great efforts to open up new coal territories, by building branch lines and spurs to mines. Ten miles north of Kemmerer, in Wyoming, are to be opened two mines, which are expected to produce 3,000 tons of coal a day. Another territory to which will be built a branch from the Union Pacific main line, is north of Rock Springs, Wyoming. All the new properties will be developed by independent interests not connected with the railroad.

"All along the Harriman lines there will be a consistent effort to help develop coal mining, for it is realized that the promotion of this industry is vital to the prosperity of the entire West. As has already been announced, the railroad companies will retire from the commercial coal business."

Smokeless Coal in England

Consul William J. Pike, writing from Kehl, Germany, says that a London inventor claims to have discovered a process for producing smokeless coal, apparently by distillation of coal at a low temperature. This, after filtration, is said to deposit a very brilliant substance, the heating properties of which are far greater than those of the original coal and which is absolutely free from smoke and dirt. The inventor contends that efforts to overcome the smoke plague have hitherto been unsuccessful because they have been made in the wrong direction, and that by the extraction of the smoke-producing material in coal before being burned he has been successful in producing a smokeless coal. Sir W. B. Richmond, president of the Society for the Prevention of Smoke, has bought up this invention.

Building More Coal Barges

More work for the force of the Charlestown navy yard to do after the battleships leave has been ordered. The orders were received from Washington for the yard to build four more big wooden coal barges for the coaling station at Bradford, R. I. The yard built about a dozen barges for the station several years ago. The order will assure employment to a number of millmen and ship carpenters of the construction force for some weeks.

The officers do not believe there will be a big reduction in the working force of the yard immediately after the battleships depart. All work is being sidetracked for that on the big ships, and when they leave the other work will be taken up. There is, the officers say, more than a year's work for a large force on the rebuilding of the armored cruiser New York, and

the orders on the Des Moines, Scorpion, Vesuvius, Celtic, Detroit and Nashville, all at the yard, aggregate a very large amount of work. One or two of the departments may feel a scarcity of work and suffer a reduction in force, but the boat shop, ropewalk, chain shop and such departments all have orders already in hand which will keep their working forces busy for some time to come.

Orders for additional work and equipment can reasonably be expected in the interval, they believe.

The yard force is at present but a few men short of 3,000 hands, the largest number in its history. After the present rush is over it is expected that gradually the force will be reduced to what is now practically recognized as its normal working force, about 2,000 men.

The various craftsmen at the navy yard have been given the privilege of submitting evidence and affidavits to the new board of wages regarding the rates and conditions of outside firms for their line of work. Up to within the past year the wage board personally asked outside firms and based their report on such replies as they received from those that desired to answer. It would surprise the public to know the number of firms that decline to supply the government with such information. Last year the Boston labor organizations were given an opportunity to submit their wage scales as evidence. This year they will be again submitted by unions whose craftsmen are employed at the yards.

United States Postal Banks

In discussing the postal-savings banks and the parcels-post systems, Collier's makes the statement, that although postal-savings banks and parcels-posts have been in high favor at the postoffice department for many years, all attempts to establish them by frontal attacks on vested interests have failed. Postmaster General Meyer has now undertaken a clever diplomatic flank movement which has encouraging prospects of success. He is enlisting the aid of some of the very interests that have blocked progress hitherto. The financial stringency has furnished his opportunity. Money has gone into hiding because its holders have been afraid to trust private bankers. This distrust, in most cases, has been entirely unjustified, but it is a fact that must be taken into account. Its results have been startling. People have forced the postoffice department to take care of their savings in spite of itself. They have bought money-orders payable to themselves, not only receiving no interest but paying fees for the privilege of depositing, and the money so deposited lies locked up, a useless hoard, in the treasury. In the five states of Colorado, Kansas, Nebraska, Oregon and Washington alone such orders to the amount of $100,000 became invalid during the last fiscal year.

Nor is that the worst. In the fiscal year 1907 the postoffice department sent abroad no less than $71,000,000 for immigrants—50 per cent. more than the amount of those recent importations of gold which shook every money center of Europe and forced the Bank of England to raise its discount rate to the highest point in a generation. Much of this drain was the natural flow of remittances to relatives at home, but much of it represented distrust of American investments. Mr. Meyer has learned that many immigrants, Italians and others, are actually sending their earnings home to be deposited in the postal savings-banks of their native countries because they have confidence in government security and we offer them no such depositories here. Thus, while we are frantically bidding extravagant premiums for remittances from Europe, we are needlessly sending abroad more than we are bringing in.

Mr. Meyer proposes to meet this situation by allowing the postoffices to accept deposits which the government would turn over to the national banks. The depositors would have an absolute government guaranty of security and would draw interest at 2 per cent. instead of having to pay fees for money-orders or hide their money in old stockings to be gathered in by the first thief that came along. The government, as the postmaster general has learned from the assurances of a number of bank presidents, would receive interest on the deposits turned over to the banks at the rate of from 2 to 2½ per cent. The bankers would have an enormous increase in available resources, and immense stores of financial power now going to waste would be saved and made useful to the community. Everybody would be helped and nobody harmed. It is hardly surprising that such a proposition is meeting a more hospitable reception in financial circles than was accorded to the postal savings-banks idea when it was regarded as a scheme for direct competition between the government and the banks.

According to statistics, the cost of every ton of anthracite coal is increased eight cents by the expense of mine timbers.

The Demand for More Basic Money

Isaac N. Stevens, until recently one of the owners, and managing editor for several years of the Pueblo Daily Chieftain, and at one time chairman of the executive committee of the national silver party in the campaign of 1896, gave out the following interview in Chicago a few days ago:

"There is not basic money enough in the world to do the business of the world. The United States is not the only country suffering from a shortage of money. The German banks have begun to enforce the sixty-day notice for the withdrawal of funds, and France, England and other prosperous countries are suffering from a lack of money. Gold does not furnish a sufficient basis for the enormous development that is taking place all over the world and for the colossal business enterprises of the present day. There has has never been greater need for world-wide bimetallism than during the last five years, and if civilization is to continue its rapid stride both gold and silver are an absolute necessity as basic money. This is the time for the Congress of the United States to inaugurate a universal movement for bimetallism.

"Congress should take action looking toward the guaranteeing of the funds of the depositors so as to bring money out of hiding.

"The government should either go into the banking business outright or have nothing whatever to do with it. If the national banks were all out and out government banks there would be no trouble about the people keeping their funds in such banks.

"Either individualism must be given the utmost latitude or else the government must go wholly into the lines of business where its control seems imperative."

And of all the countries of the earth the United States needs more money than any of them, because she is younger, more enterprising, and has far greater resources to develop. We need money in proportion to our strength, and we are the strongest nation in the world today and have just begun to grow. No man can comprehend the mighty possibilities that invite development in this country and it simply means a rapidly growing demand for money. The country needs all the gold and silver we can dig out of these mountains turned into money, as rapidly as the mints can coin it. Of course a vast amount of the two metals goes into the arts, but the remainder should be coined at an equitable and just ratio and allowed to circulate untrammeled in the marts of trade and commerce.

State Aid to Mining*

The report by the superintendent of state batteries in West Australia for the year 1906 makes interesting reading in view of the possibility of the Transvaal following the example of that country at some more or less distant date. It appears that several of the districts where state plants were erected and started crushing in 1905 have been most disappointing. The Duketon field, where an exceptionally good plant was granted, failed to produce sufficient ore to permit of anything but most intermittent crushing. At several other batteries the districts are not producing sufficient stone to make the running of the plants a profitable undertaking.

The superintendent adds: "It is often apparent that working costs could be somewhat reduced by adopting stringent action such as closing the plants and awaiting a sufficient quantity to enable expenses to be reduced to a minimum, but unfortunately it frequently happens that the water supply will not permit of running full time, consequently to enforce a principle of closing down would necessitate the department seeking an additional supply, already ample for all the stone as forthcoming, but inadequate if an accumulation of stone caused the mill to run full time. Viewing the matter in this light it is questionable which course is best to advocate or adopt, as the prospects are anything but encouraging at many places." The Huntingdon mill, used in one district, was another disappointment, the nature of the ore in the district together with the small quantity offered for crushing caused the plant to be run at a heavy loss, and as the district did not warrant an expenditure necessary to remove present shortcomings, it is questionable whether the department is not justified in meeting public requirements by contributing by subsidy to the only privately-owned mill, and in disposing of the Huntingdon mill with its accessories. Amongst the list of batteries which have maintained a good position is Coolgardie, while Coolgardie's prospects have greatly improved and with the increased tonnage the management has reduced working costs to a favorable standpoint.

Treatment of Large Parcels.

Throughout the year all customers with parcels of stone having a tonnage of 150 tons or over have been granted a concession of ten per cent. off usual crushing rates. The object of this concession is to encourage the working of large reefs in bulk; the amount of stone treated upon which a discount has been allowed amounts to 27,417 tons, while the amount of money paid away has been £1,669 14s. 4d.

Tin Dressing Plants.

Both plants have had a very successful year's work, the output being: Bunbury End plant, 5,210 loads for 79 tons oxide of tin; North End plant 6,218 loads for 66 tons oxide of tin. These plants are placed one at each end of the field and are under the one manager, and prospects are encouraging for future operations.

Direct Purchase of Tailings.

Prospectors have in many instances taken advantage of this principle by effecting a settlement on the basis of seventy-five per cent. of the assay values of their tailings in preference to waiting for the treatment of their sands. Under this heading 13,817 tons were dealt with, representing a gross value of £18,637, of which £11,728 was paid to owners. In addition to this last-named amount, £12,586 was paid to prospectors after treatment of their sands, making a total of £24,314 refunded to owners.

Portable Plants for New Districts.

This is a subject which has occupied the attention of the department for a considerable time. A trial was given of a single stamp mill (the Embleton) at the Coolgardie state battery but results did not justify its adoption. While it is recognized that small mills possess many advantages, they hardly fulfill the requirements of a state plant in so much that the output is too small to retain a suitable staff. The department cannot control a small plant as cheaply as the private individual, and what may be a successful adjunct to a mining property held by a party of prospectors, would prove a failure if attended to by officials whose expenses would not be reasonably met by the output of the plant even when run at full capacity. Up to the present no small stamp mill has attracted more than casual attention, and it would appear that some other principle than stamps will have to be introduced to be of any assistance in a district comparatively undeveloped. Whatever class of plant is adopted, it may be desirable in cases of this kind to look upon the outlay as a district vote and allow the plant to be managed and controlled by the prospectors themselves, thus causing them to carry the responsibility of proving their district worthy or otherwise of securing at a later date a 10-head battery controlled by the department. The superintendent concludes:

"While freely admitting that some of the plants might well be replaced if money were available and that by further expenditure improvements would be possible in all of them, I would like to emphasize the fact that the sphere of the battery system has been enlarged in the last few years, as when the system was first initiated the object was to provide plants for crushing purposes only, while now nothing short of complete treatment plants will satisfy the public. It is not a matter for surprise that some of the older plants find little favor in the eyes of persons accustomeod to the more modern plants on some of the mines in this state."

*The South African Mines, Commerce and Industries, Oct. 26, 1907.

WESTINGHOUSE ELECTRIC

The receivers of the Westinghouse Electric & Manufacturing Co. have issued a general balance sheet as of October 23, 1907, which shows a profit and loss surplus of $11,610,756.

The receivers have taken pains to figure the assets down to a basis as conservative as possible.

The balance sheet as of October 23 follows:

Assets.

Property and plant	$12,342,223
Quick assets	2,721,839
Accounts receivable	9,210,671
Notes receivable	3,534,698
Interest accrued, not due	195,307
Working assets	17,799,465
Investments	29,490,614
Other assets	7,523,106
Total assets	$82,817,923

Liabilities.

Preferred stock	$ 3,998,700
Assenting stock	23,937,195
Non-assenting stock	600
Funded debt	20,469,000
Collateral notes	8,702,702
Current liabilities	13,462,609
Interest accrued, not due	410,528
Current accounts, special	13,875
Reserves	211,956
Profit and loss—surplus	11,610,756
Total liabilities	$82,817,923

The report then deals in detail with the property and plant, quick assets, accounts receivable, etc.

Over $1,500,000 has been spent on the placer beds of the Colorado river, where it borders Arizona. It has all been practically thrown away, due to bad management rather than lack of values.

The Minnequa Steel Plant of the C. F. & I. Co. at Pueblo

In an article of this nature only a few of the principal features of this immense plant can be touched upon, for a good sized book would scarcely cover all the details of the industrial, administrative, mining, distributing, and manufacturing departments. Some idea of the scope of this company may be gained from the plant's production, which in one year produces about 2,000,000 tons of iron and steel, and uses over 5,000,000 tons of coal. The company annually mines from its own properties 400,000 tons of limestone and 900,000 tons of iron ore. The iron mines cover large areas in Colorado, Wyoming, New Mexico and Utah, while the coal comes largely from Wyoming and New Mexico. Limestone is obtained from company quarries at Lime, about six miles, and Calcite, ninety miles from the Minnequa plant. The C. F. & I. Company has spent a fortune in developing its water supply, and a daily capacity of 50,000,000 gallons is now available for use. The annual net earning of this institution—for an institution it has become—is over $3,000,000, and its monthly pay roll totals nearly $300,000. Among the 4,000 to 5,000 workmen employed at the Minnequa plant, there are twenty-two languages spoken, and if all the mines and plants of the company are considered, they would muster 10,000 men in the industrial army of the Colorado Fuel and Iron Company.

The plant consists of various departments, including the blast furnaces, the converter plant of the bessemer process, and the open-hearth process, besides the finishing mills which consist of a blooming mill, rod mill, wire mill, and rail mill. These mills and the numerous pattern, blacksmith and carpenter shops will not be taken up, but the space devoted to the processes of making iron and steel. In manufacturing steel from iron ore, the ore must first be reduced to pig iron in the blast furnace, and then this pig iron must have its impurities removed by the oxidizing or reducing action of the bessemer or open-hearth process. When this has been done the steel is ready for the mills, and is made into rails, wire, nails, rods, etc.

Blast Furnaces.

There are five blast furnaces in all, two old ones of seventy-five feet in height and seventeen feet in diameter, and three new ones, ninety-five feet high and twenty feet in diameter. The older types have a capacity of 200 tons each per twenty-four hours, and the new ones 400 tons each. The charge in the larger furnaces consists of approximately 8,000 pounds of limestone, 20,900 ore (55 per cent. iron), and 22,000 pounds of coke. The charging is done by means of a Rust automatic charging hoist which conveys the cars to the top of the furnaces over an incline bridge truss. The furnaces are each equipped with four hot-blast stoves, two blowing engines, besides dust catchers and gas washers. The hot blast stoves are of a modified Cowper type, being a two-pass stove, that is, the air passing up and back through the stove. They are cylindrical, dome-capped structures about 106 feet high, and twenty-one feet in width. The interior construction consists of arches about six feet in height at the base, with a honey-combed arrangement of the bricks to within about ten feet of the top. The blowing engines are an upright type made by Wm. Todd Company of Youngstown, Ohio, and produce an air pressure of about thirty pounds per square inch in the main pipe. The downcomer pipes runs from both sides of the furnaces and join about half way from the top of the stack forming a Y, and the one pipe enters the dust catcher, which is about twenty-four feet in diameter. The gas washers are connected to the dust catchers, there being two washers to each dust catcher.

Bessemer Process.

The bessemer department is equipped with three ten-foot iron cupola furnaces, three seven-feet spiegel cupola furnaces, two 150-ton molten metal storage reservoirs, and two fifteen-ton converters besides traveling cranes, blowers, launders, etc. The reservoirs or mixers are used in mixing the molten pig iron in order to obtain a uniform charge for the furnaces. The pig and spiegel furnaces are similar in construction but different in size. They are open at the top with a hood above to carry off the gas and smoke.

The bessemer converter is a blunt elliptical shaped vessel with supports fastened at its greatest diameter, so that it may be tipped through any angle required to empty the charge. The bottom is filled with air passages or tuyeres of which there are nineteen in a fifteen-ton converter. After the converter is lined and a charge of pig iron dumped in a gentle blast is started and gradually raised to twenty-five pounds pressure. By the appearance of the flame the progress of the operation is known, and at the proper point the speigel iron is added, and the charge immediately poured into ladle, from which the ingots are filled. These ingots are sent to the rail mill. The time of blowing is from twenty to twenty-five minutes.

Open-Hearth Process.

There are six open-hearth furnaces in operation at the Minnequqa plant, and an additional six will soon be running. The open-hearth furnaces are not open-hearth, but received the term because the hearths are comparatively accessible through the five charging doors along the sides. The dimensions of these furnaces are sixty feet in length by seventeen feet in width and have a capacity of from fifty to sixty tons per charge, the time required for each charge being from eight to twelve hours. An average composition of a charge would be 60,000 pounds of pig, 8,000 pounds of limestone, and 60,000 pounds of scrap iron. Air and gas are sent into the furnace, their action being reversed every fifteen minutes. The gas is made in forty-eight gas producers of the Duff type. During the purifying process hematite ore, flourite and dolomite are added to remove the carbon, sulphur and phosphorus respectively. When the charge is finished it is tapped into a large ladle, where about twenty per cent. ferromanganese is added, and it is then poured into ingot moulds. To tell when a charge is completed fracture tests are made upon small samples from the furnace. When the new furnaces are in operation the open-hearth plant will have a total capacity of 1,500 tons in twenty-four hours.

Some of our best superintendents and mining engineers are men who have never attended a technical school. However, it is not because they are practical men. but in spite of the fact, for it takes lots of study and a clear thinking man to successfully cope with geology and its branches. The young mining school graduate has a clear understanding of mineralogy, lithology and first principles of geology that very few men will acquire in a half dozen years, and such subjects are more valuable than practical men are likely to admit.

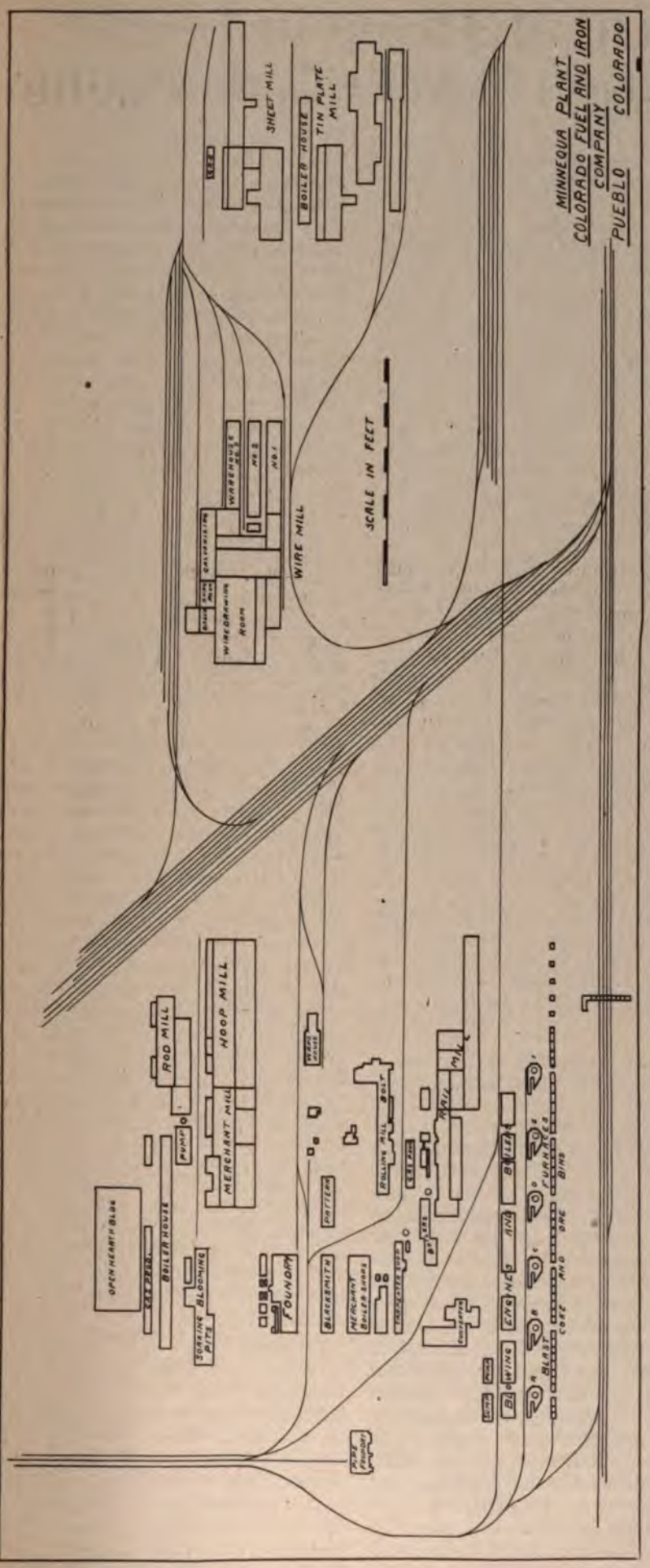

Diagram Showing the Position of the Various Mills and Furnaces at the Minnequa Plant of the Colorado Fuel & Iron Co.

MANUFACTURE OF IRON BY ELECTRICITY.

A new process for electric manufacture of iron has been invented by Mr. A. Hiorth for the treatment of Norwegian ores. Actually large quantities are shipped to foreign places and partially return to Norway converted into iron. Mr. Hiorth considers that the Norway mineral might be transformed into iron on the spot by an electric process made practical by the numerous heads of water, provided that imported coal is not utilized. For this he advocates the utilization of the extensive graphite deposits in Norway, which are not mined because not pure enough for pencils, crucibles, etc. Some time ago he endeavored to manufacture calcium carbide by melting graphite with lime. The satisfactory results obtained led to the idea of employing graphite as a reducing agent for iron ore in electric furnaces. Mr. Hiorth is confident that the metal thus manufactured can compete with the blast furnace iron of other countries, from the point of view of quality, and is cheaper, owing to the enormous amount of available graphite and power. Experiments have demonstrated that graphite is a remarkable reducing agent, and excellent iron was obtained electrically from very impure mineral, containing more than thirty per cent. of foreign substances (silicate acid and silic acid). These impurities pass into the slag, which gives an excellet raw material for building. These experiments are followed with great interest in Norway and other countries, a proof being the subsidy recently given to the inventor by Mr. Carnegie.

Upon the addition of potassium cyanide to the alkaline copper solution in the determination of copper ores, the reaction are as follows: $2\ KCN + Cu(OH)_2 = Cu(CN)_2 + 2\ KOH$; $2\ KCN + 2\ Cu(CN)_2 = 2\ KCN.\ Cu(CN)_2$; $2\ KCN.\ Cu(CN)_2 + Cu(OH)_2 = 2\ Cu\ CN + 2\ KCN$. The free KCN or potassium cyanide then reacts on the copper hydrate, hence the cyanide should not be too rapidly.

In France two taxes are imposed upon mining, one to the government and one to the owner of the surface of the ground. The French never lose sight of the fact, that they hold the land from the government, hence the ill feeling shown in this country over jumping a claim is not so prevalent there. In some localities of the United States, claims are held for years by $100 worth of assessment work simply because the residents dislike to become claim jumpers.

Routine Analytical Methods in Use at Butte Reduction Works Laboratory

Insoluble for Sulphide Ores.

Five g. ore is weighed into a No. O beaker, moistened with water, 10 c. c. nitric acid added and the beaker placed on sand bath exposed to moderate temperature. When the S begins to separate, a little potassium chlorate is added to oxidize the S. It is then taken almost to dryness, 2 or 3 c. c. HCl added and taken to complete dryness. The residue is then taken up in 10 c. c. HCl and 20 c. c. water, brought to a boil, filtered and washed. The residue is then placed in a Battersea crucible, incinerated until the residue is white, cooled and weighed. If the ore contains lead, wash three times with amonium acetate and then with hot water. Ammonium acetate is made by adding acetic acid to strong ammonia water until just acid.

Oxidized Ores.

Five g. ore is weighed into a No. O beaker, 10 c. c. HCl and two or three drops HNO_3 added, evaporated to dryness, and taken up as above, filtered and washed. Some oxidized iron ores do not yield to the preceding treatment. If 3 or 4 c. c. concentrated solution of stannous chloride ($SnCl_2$) is added to the residue obtained from treatment with HCl and HNO_3, they will readily go into solution.

Slags.

Five grm. slag is weighed into a No. O beaker, 5 c. c. HCl added, taken to complete dryness, 10 c. c. HCl added when cool, and when residue has digested for about a minute the silica is broken with a stirring rod and the silica adhering to the stirring rod washed into beaker with very little HNO_3, again taken to dryness, finally taken up as above.

Silica.

The insoluble residue is fused with 3 grms fusing mixture (equal parts potassium and sodium carbonates) in a Pt crucible for about 5 minutes. When the crucible is cool it is placed on its side in a caserole, enough water is added to cover the melt, then 15 c. c. HCl added slowly enough to avoid too rapid evolution of CO_2. After melt has been disintegrated and dissolved, the crucible is carefully washed and the washings run in the casserole. Any adhering silica is rubbed off the crucible with a rubber policeman. The solution is now evaporated to dryness and the operation repeated a second time. Residue is then taken up in dilute HCl (4:1), brought to a boil for a few minutes, filtered and washed.

Sulphur.

One grm of the ore is weighed into a No. O beaker, 10 c. c. HNO_3 added and placed on a sand bath where it is subjected to a mild t°. Completely oxidize the S with $KClO_3$. It can be taken safely to dryness, the sulphuric acid combining with the K introduced in the chlorate to form K_2SO_4. Take up as in the case of insoluble, filter, wash. Place filtrate on sand bath, bring to boil, add hot solution of $BaCl_2$, and after boiling a minute take from the sand bath. $BaSO_4$ settles rapidly and the supernatent liquid is decanted through a filter and the ppt. washed three or four times with hot water. The filter containing the precipitate is placed in a porcelain crucible, ignited, cooled and weighed. When greater accuracy is required the ore is treated with nitric and chlorate as above and taken to dryness. It is then taken up with HCl and water, filtered and washed. The iron in the filtrate is ppt. with ammonia and brought to boil for two or three minutes. The iron and Al hydrates are filtered and washed. The filtrate is acidified with HCl and the S. precipitate as in the preceding scheme.

If iron is to be determined, the ferric hydrate can be dissolved with dilute HCl and determined as given under iron.

Weight of $BaSo_4 + 0.1375 = S$. If many determinations are to be made it is well to weigh a charge containing 1.375 grms. The weight of barium sulphate then equals the per cent. of S.

Copper.

Cyanide Method.—Five grm ore is weighed into a No. O beaker, moistened with water, 10 c. c. HNO_3 added with a little potassium chlorate. When decomposed and the Cl from the chlorate has been expelled, a little water, hot, is added. The solution is then wished into a No. 4 beaker, diluted until the beaker is nearly two-thirds full, 15 c. c. NH_4OH added and the solution titrated with a standard solution of KCN. The ferric hydrate settles quite rapidly and the fading of the blue to a faint violet can easily be detected in the supernatent liquid. Standard KCN is made by dissolving 35 g. of the salt in a liter of water, but is best standardized in matte or ore in which the Cu has been determined electrolytically. When the ore contains more than four per cent Zn the above simple direct method will give high percentage.

Five g. ore is treated with 7 c. c. HNO_3 and 5 c. c. H_2SO_4 in a 200 c. c. beaker and the nitric completely expelled; this is shown to have occurred when dense white fumes of SO_3 begin to come off. The solution is then cooled and 100 c. c. water added and six pieces of Al foil about 1 in. sq. placed in the solution, which is boiled for about ten minutes, or until it becomes colorless. The Cu is precipitated on the foil from which it becomes loosened and sometimes forms in spongy masses. The supernatent liquid is decanted through a filter and washed by decantation three times. The precipitated copper is dissolved in 10 c. c. HNO_3 and as much water, and the solution decanted to beaker in which titration is to be made. After washing foil by decantation, the beaker is placed under the funnel and what Cu has been collected on the filter is dissolved in hot HNO_3 (1:3), and the filter washed. Solution is now made ammoniacal and titrated as above.

Colormetric Assay.—One grm tailings or low grade ore is treated as for cyanide assay with the exception that the solution is diluted and made ammoniacal in the beaker that the charge is weighed in. It is then filtered into a 16 oz. clear glass salt mouth bottle, diluted to the mark and compared with the standards. Slags are treated as in the method for insolubles. After making ammoniacal, the solution is boiled so as to thoroughly break up ferric and aluminum hydrates. It is now filtered and washed three times, diluted to the mark and compared with the standard. A No. 1 beaker is a more convenient size for slags. When greater accuracy is required, as well as greater rapidity, proceed as if Zn were present, make ammoniacal and compare with the standard. Very good results can be obtained in this way. Standards are made by dissolving 8 gms C. P. Cu foil in a little hot HNO_3 diluting to a liter and the corresponding number of c. c. taken that are required for the various standards.

Electrolytic Methods.—One grm ore is weighed into a No. 1 beaker and moistened with water and 10 c. c. HNO_3 added and exposed to a mild t° on sand bath. When S has separated out in yellow white flakes, the beaker is placed on the hotter portion of the sand bath, exposed to a temperature just below boiling. When Cu has dissolved 1 c. c. sulphuric is added, and

the solution diluted to about 30 c. c., brought to a boil and filtered into a battery beaker of 200 c. c. capacity. Beaker is filled within ¼" of the top and electrolyzed over night with a current density of .15—.2 amp. per 100 sq. cms. Have equal amount of acid in all assays.

Amount of acid present should not exceed ten per cent. in volume. To determine the complete precipitation of Cu, water is added so as to expose ½" more of the cathode stem to the current, which is slightly increased. If the freshly exposed surface does not become coated with copper within an hour it is perfectly safe to remove the electrodes, wash with water, dip in alcohol, dry at 100° C. and weigh.

Mattes are treated as above with the exception that 5 c. c. H_2SO_4 are added instead of 1 c. c. Silver is deposited with the copper and this correction must be applied to the result. Silver determined by a fire assay of the material. One per cent. for every 291.66 ozs. Ag.

Ores containing considerable As are found to give a great deal of trouble, causing dark deposits and giving high results. One gm of ore is weighed into a No. 1 beaker, moistened with water, 10 c. c. HNO_3 and a little $KClO_3$ added and then taken to complete dryness. It is now taken up with 10 c. c. HCl and 5 c. c. H_2SO_4, and 3 or 4 c. c. bromine water added. The HCl and Br are completely expelled. If much As is present, repeat the above. Solution is cooled, diluted to about 30 c. c., brought to a boil and filtered. Five c. c. HNO_3 are added and electrolyzed.

Bi sometimes interferes. One g ore is weighed into a No. 1 beaker, 10 c. c. HNO_3 added and a little $KClO_3$ and the solution taken to dryness. Residue is then taken up with 30 c. c. concentrated solution of ammonium nitrate and boiled for a few minutes. Solution is cooled, filtered and washed with cold water.

Lead also interferes, as after the electrolyte has been exposed to the current for some time it dissolves from the anode and is deposited upon the cathode. If it prove to be present 5 c. c. H_2SO_4 are added (dilute 1:4), solution brought to boil, filtered again and washed. Add 10 c. c. HNO_3 to the filtrate and electrolyze.

Converter Copper.

One g. granulations are weighed into a No. 1 beaker and dissolved in 10 c. c. 1:2 HNO_3 gently warmed. When the solution is complete, a single drop of HCl is added to precipitate Ag, 10 c. c. water added, solution boiled, filtered and washed. Ammonia is added to the filtrate until just ammoniacal. Solution is now acidified with 5 c. c. HNO_3 and as much H_2SO_4 diluted to the required volume and electrolyzed with C. D.=15 amps.

Mine Water.—100 c. c. measured into a battery beaker, 10 c. c. HNO_3 added, solution diluted to the required volume and electrolyzed.

Alumina Al_2O_3.

Alumina is determined in the filtrate from the insoluble residue. If any metals of the H_2S, or second group, be present, they are precipitated by this gas and filtered out. The filtrate is boiled to rid from H_2S and the solution is oxidized with a little $KClO_3$. The ferric and aluminum hydrates are precipitated with 15 c. c. NH_4OH, the excess ammonia expelled by boiling and the solution filtered. If much Mn is present the precipitate of iron as a basic hydrate must be resorted to. If considerable lime MgO or Zn, or if a fusion has been made resulting in much K or Na chlorides, a double precipitation is required. The precipitate on the filter is dissolved in hot HCl, dilute, and the iron and alumina precipitated and washed as before. The combined precipitates are now placed in a crucible and gently ignited, cooled, moistened with two or three drops of HNO_3, the HNO_3 gently expelled, when ignition is carried to a higher t°. The combined oxides are weighed, the Fe_2O_3 calculated from the Fe determined in a separate portion of sample and deducted from the combined weight of oxides. If fusion has been resorted to, as is almost invariably the case, after combining the filtrates the solution containing the ferric and aluminum chlorides is divided into two equal portions and one used for determining the Fe and the other for the alumina.

Iron.

The filtrate from the insoluble residue is used for this determination. If only the Fe is desired the solution is diluted to about 120 c. c., 5 g. test lead added and boiled until the solution is colorless and fails to give characteristic pink when a drop of the solution is added to a drop of ammonium sulphocyanide. The solution is now decanted and the lead washed four times by decantation. The solution is now titrated against a standard solution of $K_2Cr_2O_7$, using a fresh dilute solution of potassium ferricyanide as an indicator. The complete oxidation of the iron is determined by the disappearance of blue by adding from time to time a drop of the assay solution to a drop of the indicator on a spot plate. The standard solution of bichromate is made by dissolving 4.3925 g. of the salt in one liter water. It is standardized with pure Fe wire. .2 g. Fe wire dissolved in 25 c. c. HCl (1:4), diluted, reduced and titrated as above.

If a great many irons are to be estimated, time can be saved by reducing with two or three drops of stannous chloride solution and the excess stannous chloride precipitated with mercuric chloride in slight excess. If Cu is present Fe must be precipitated with NH_4OH and dissolved with hot dilute HCl and proceed as outlined. The reduction with test Pb has the advantage of precipitating the Cu and reducing the Fe at the same time.

Fe divided by .7 will give Fe_2O_3

$Fe_2O_3 \times .9 = FeO$

$Fe \times 1.286 = FeO$.

Lime CaO.

The lime is determined from the filtrates from the ferric and aluminum hydrates. Volume of the solution must be small as possible and ammoniacal. It is well also to have considerable NH_4Cl present. To the strongly ammoniacal solution is added a solution of ammonium oxalate. The solution containing the precipitate is placed on a sand bath and brought to a boil. It is then transferred to a warm place and left to stand for two hours before filtering. If much Mg is present, the precipitate of CaC_2O_4 is dissolved in hot dilute HCl, filtered, washed, solution made ammoniacal and the calcium precipitated. If Mg is to be determined the filtrates are combined. The precipitate is washed well with hot water, made slightly ammoniacal, dried and ignited at a high heat until the weight is constant, and weighed as CaO. Some chemists prefer titrating with potassium permanganate. The precipitation of CaC_2O_4 is washed well, a small hole punched in the filter and the precipitate washed into a beaker with a fine jet of water. The filter is now thoroughly washed with dilute sulphuric into the beaker. After the precipitate has dissolved, it is diluted to 150 c. c., brought to a boil and titrated with standard permanganate. Standardize with pure Fe wire, .2 g. dissolved in 25 c. c. H_2SO_4 diluted and reduced with Zn, H being expelled by boiling. .5 Fe factor will give the CaO factor. Or standardize with oxalic acid—.5 g. $H_2C_2O_4$ are weighed into a No. 2 beaker, dissolved in 75 c. c. water, 30 c. c. H_2SO_4 added (1:4) boiled and titrated. 8-9 oxalic factor=Fe factor.

Magnesia.

Mg is determined in the filtrate from the CaO. Volume of the solution is kept as small as possible. Mg is precipitated as ammonium magnesium phosphate, by means of a solution of di-sodium phosphate. Let stand in the cold for 12 hours, filter, wash with cold water, made ammoniacal until the

washings give no precipitate with magnesia mixture (1 part $MgSO_4$×1 part NH_4Cl+8 parts of water). Dry the precipitate, ignite in weighed crucible until the weight is constant. Magnesium pyrophosphate results $Mg_2P_2O_7$.

Weight found × .3604=MgO.

Manganese.

One g. of ore is weighed into a No. 2 beaker. If oxidized proceed as for insoluble in oxidized ores. If sulphide proceed as for insolubles in sulphides. Take up with 10 c. c. HCl and as much water, bring to a boil and dilute to about 75 c. c. To hot sulphide add Zn emulsion (Zno and water to form a paste) until solution is neutralized. The solution is now titrated with a standard solution of permanganate. The oxides settle rapidly, thus permitting the end reaction, a delicate pink, to be seen in the supernatent liquid. If much Mn be present, better results can be obtained by taking a smaller sample for assay. If organic matter is present it must be removed by filtering along with the insoluble residue. The Fe factor × .2946=Mn factor. Mn × 1.3=MnO.

Zinc.

Five g. of the ore is weighed into a casserole and 10 c. c. nitrohydrochloric added and evaporated almost to dryness. Take up the nearly dry mass with 10 c. c. saturated solution $KClO_3$ in HNO_3, take to dryness, avoiding baking. The residue is now taken up with 5 g. NH_4Cl+20 c. c. water+10 c. c. NH_4OH, boil for two minues, breaking all clots, filter, wash residue with hot water made slightly ammoniacal and containing ten per cent. NH_4Cl. The filtrate is acidified with HCl, and if Cu be present it is precipitated by boiling with test Pb. The solution is cooled and titrated with a standard solution of potassium ferrocyanide, using uranium acetate as an indicator on a spot plate. End reaction is marked by a brown color.

The standard solution of ferrocyanide is made by dissolving 22.5 g. of salt in liter of water. Standardized with .2 g. ZnO, dissolved in 20 c. c. 1:4 HCl, diluted to 150 c. c. and titrated. ZnO must be ignited to destroy the carbonate. May use pure Zn. ZnO×.80344 =Zn.

If slags and ores are free from Mn the Zn can be determined in filtrates from ferric and Al hydrates, making a double precipitation if much Fe and Al be present, and combing the filtrates. Zn×1.246=ZnO.

Lead.

Five g. is weighed into casserole, 10 c. c. HNO_3+5 c. c. H_2SO_4, added, and the HNO_3 expelled. Cool the casserole, add 50 c. c. water and boil. Wash three times with hot water by decantation, pouring the washings through filter. Dissolve the $PbSO_4$ with 10 c. c. hot solution ammonium acetate. Pour the solution through the filter, wash three times with acetate and three with water (hot), acidify with acetic acid, dilute to 150 c. c., heat almost to boiling and titrate with a standard solution of ammonium molybdate, with tannic acid indicator (1 g. tannin to 300 of water). Use spot plate. The end reaction is shown by light yellow. Standard solution: Dissolve 4.5 g. of salt in liter of water. Standardize with C. P. $PbSO_4$. Make ammoniacal, acidify with acetic, dilute and titrate. May use C. P. lead foil dissolved in HNO_3. $PbSO_4$×.68292=Pb.

Sulphur and Arsenic Determinations

By W. C. Ebaugh and C. B. Sprague.*

A method involving the use of sodium carbonate and zinc oxide for sulphur and arsenic determination was devised by one of us some years ago, and has given uniform satisfaction in various assay offices for a long time.

One part of dry sodium carbonate and parts of zinc oxide are mixed thoroughly. In the case of sulphur determination a weighed sample of the material to be analyzed (usually one-half gram) is mixed intimately with enough of the sodium carbonate-zinc oxide re-agent to afford at least twice as much sodium carbonate as would be required by the sulphur, arsenic, etc., present, and placed in a small porcelain dish, covered with the re-agent and heated to redness in a muffle for fifteen or twenty minutes. A shorter period of heating, is usually sufficient, but the time here specified is ample for all cases. The residuo is then extracted with water, boiled and filtered, the filtrate made acid with hydrochloric acid, precipitated with barium chloride, and the barium sulphate treated as usaul.

In an arsenic determination the substances are treated as above, until the alkaline solution is filtered from the residue. This filtrate is acidified with acetic acid, precipitated with silver nitrate, boiled for a few minutes and then filtered. The precipitate of silver arsenate is washed thoroughly with hot water and then dissolved in dilute nitric acid, its silver content being determined finally by titration with ammonium or potassium sulphocyanate in the usual way. Ferric sulphate is used as an indicator. In calculating the arsenic present, use the proportion.

3 Ag: 1 As:: Weight of silver found: Weight of arsenic present.

The method has been tried successfully as galenite, pyrite, arsenopyrite, chalcopyrite, sphalerite, etc., with sulphates like gypsum and anglesite; and with metallurgical products like matte, speiss and flue dust. In the case of heavy spar analyses, the method is not superior to the ordinary fusion with an alkali. The fact that the decomposition with sodium carbonate and zinc oxide has been employed for control and umpire assays upon ores in commercial work for so long period without objection is evidence that the results obtained by the method are accurate.

It will be seen that the method for sulphur is a modification of the well-known Eschka method, and that for arsenic is an improvement upon Pearce's method. The advantages of the decomposition described are (1) that the mass resulting from the heating is not fused, but can readily be removed from the dish and leached with water; (2) the ease and speed with which sulphides, sulphates, arsenates, etc., are decomposed; (3) no time-consuming subsequent evaporations are necessary, and (4) the absence of a large quantity of alkaline and other salts from the solutions in which the precipitations of barium sulphate and silver arsenate are effected.

*Journal of the Western Association of Technical Chemists and Metallurgists.

A company operating on a peat bog in the vicinity of Orlando, Florida, dispenses with the molding into bricks, simply dumping the disintegrated peat on the ground and allowing it to dry in irregular masses, which are later broken with hammers into lumps. This practice is reported to give excellent satisfaction and to save the expense and trouble of bricking the wet pulp. It has the disadvantage, however, of requiring more space for storage. Possibly this method would not work so well in other parts of the United States as it does in the hot climate of Florida, but it is worth considering, as it effects large saving in the cost of manufacture.

From some sources we are told that gold mining on the Rand is the acme of perfection, but recent articles in a South African paper go to show that the white men do about one half as much work as American miners, and receive more pay.

With copper selling about 18 cents per pound, wages in the Bingham district, Utah, were $3.25 per eight-hour day for machine men, $3 for helpers, $2.75 to $3 for hand steel miners, $2.75 for muckers, $3.25 for timbermen and $2.75 for hand trammers.

Mining Letters from Correspondents

Mines and Mining Wishes to Secure an Actual Reputable Correspondent from the Mining Centers of the World

Denver

Dec. 11.—There appears to be a steady revival in all departments of business throughout the state. By the first of January the banks will be doing their normal business and all other departments will fall into line. The weather has been favorable and building improvements go steadily on Thus far the holiday trade is quite up to last year when times were at the top notch. From the amount of business visible on every hand one would not think there was any financial stringency anywhere.

The November earnings of our two leading Colorado railroads, the Colorado & Southern and the Denver & Rio Grande, show a marked increase over the corresponding month of last year. The increase in the gross earnings of the Colorado & Southern was close to a quarter of a million dollars. There has been a slight falling off in tonnage from the metalliferous mines, and an increase in tonnage from the coal mines. The earnings of the two companies were as follows:

	Nov., 1907.	Nov., 1906.	Increase.
Colorado & Southern	$1,356,229	$1,152,853	$203,376
Denver & Rio Grande	1,812,300	1,804,700	7,600

With the D. & R. G. it was nip and tuck between November, 1906, and November, 1907, a difference of $7,600.

A report comes from Butte this week that orders have been received from the Amalgamated Copper Company's directors to close all the subsidiary companies except those of the Boston and Montana, including the big smelters at Anaconda and North Butte, and the Butte Coalition. This means that the Butte mining district is practically closed, with production less than 2,500 tons of copper a day. There will be very little revival in the great copper camp until that metal takes a jump of several points and money circulates freely again.

Recent dispatches from Leadville state that one of the largest independent smelters in the West will probably be built at that point during the year 1908. There are millions behind the deal and those concerned are the owners of the famous Greenback mine at Bingham, Utah. This syndicate owns the smelter at Bingham, which has been closed down by injunction proceedings.

The suit was brought by the farmers in the vicinity of Bingham, who allege that the fumes from the furnaces are ruinous to vegetation. It now looks as though the injunction will be made permanent.

As a result of the suspension of the smelter, the Greenback mine has also been forced to close down, but the owners do not propose to keep shut down for any great length of time. They have investigated freight rates and find that they can ship their ore to Leadville and smelt it there just as cheap as they can at Bingham, as the necessary fluxing ores they must have can be obtained in Leadville.

For a long time a surveying corps has been in Leadville investigating smelter sites, and, it is understood, have determined upon one which will probably be purchased if the price is right.

In addition to treating its own ore, the Utah syndicate would go into the the Leadville market for custom ores, and this fact is being hailed with delight by the mine owners who object to the present methods of the smelter trust.

Bisbee, Arizona

December 7.—It is rumored that the Calumet and Arizona Company will this month produce twenty-five per cent more copper than in November, and, as the company is putting more men to work, it must be acknowledged that there is some ground to the story. Up to the present time, however, no appreciable increase in shipments has been made.

The Copper Queen Holbrook shaft has been repaired, and men are again at work. All the other shafts are in good shape. The production for November has not been made public so far.

The Superior & Pittsburg Hoatson, Junction and Cole shafts have explored their new ore bodies and are still in the ore which runs pretty high in some instances. Shipments to the Douglas smelter continues about the same as before, (550 tons daily.)

The Shattuck-Arizona today began hiring men in order to resume development work on new levels. No ore has been shipped to the smelters for some time.

On the Denn-Arizona nothing new occurred during the past week, the property remaining idle.

On the Wolverine & Arizona development is still being prosecuted; no ore being shipped until the price of the metal regains a fair figure.

On the Warren sinking is still being pursued. Reports of some good ore being encountered comes from this property.

The directors of this company will meet in this city next month when the question of building a smelter at Douglas will be settled.

A meeting of prospectors was held here this week at which resolutions were passed asking Congress to pass a bill waiving assessment work for the year 1907 and 1908. This move has been taken up all over the territory and up to the present time a petition bearing 300 names has been circulated.

The Butte-Arizona miners and muckers of this property, which is situated in the Huachuca mountains about thirty miles from Bisbee, quit work on account of the reduction in wages from $3.75, conforming with the decrease of the Bisbee camp. New men have been hired to go out to the property. The property itself is in the best possible condition. It is expected that the tunnel will reach the contact in a fews days. Ore brought from the property gives good values in copper and silver.

Since the closing down of the Green Cananea property the company has been repairing all the equipment in need of repairs, and at present the smelter is being overhauled. A party of officials of the company were at Hermosillo, Mexico, last Saturday, where they went to arrange with the government on the wage scale which will be put in force when the company resumes. When that will occur is unknown at present. The population of Cananea is estimated at 2,000, compared with 22,000 six months ago.

During the past week the dispatches from the East to the effect that owing to the various measures taken by the government, the bankers, and the large commercial interests, the financial institutions would soon resume payments of withdrawals in cash, served to still further improve the confidence of the local public in the general situation, and strengthen everyone in the conviction that the present depression will be of short duration. Just when the local banks will return to the old method of doing business is entirely dependent on the action of the eastern bankers, but

it can be stated that it will be done as soon as posible.

The peculiarity of the local situation has been that although the banks have been operating on a clearing-house basis there has been comparatively a large amount of currency in circulation as compared with other cities in the southwest. There has been practically no inconvenience experienced whatever, the chief local anxiety being in regard to the price of copper metal.

The two big operating companies are still retaining all of their employes, and owing to the Sunday work the pay rolls on the coming pay days will undoubtedly be as large as last month, so that the current business of the city will be maintained at the normal standard.

In regard to the price of copper metal, there is little that is definite; quotations are fluctuating, owing to spasmodic buying by the big consumers. There is still a considerable supply of the metal on hand and the buyers seem to be adopting the course of buying in spurts and then allowing the prices to sag again. This mode of procedure can only be maintained for a short time, when the producers will again bring the price to its normal level. When this happens wages will again rise, and the smaller properties which have closed will be reopened.

In addition to the improvement in the financial situation, and copper market, local people have the greatest confidence in an early return to the old prosperous condition.

Arizona now has 32,000 acres more timber land in the Prescott National Forest by reason of a proclamation making two additions which is issued by the President. The tracts are under forest service administration and protected from fire, theft and waste. The addition gives the Prescott forest an area of 1,063,256 acres of land including that located in the central portion of Yavapai county between the boundary line of the present forest and the Baca grant. It occupies a portion of the divide between Williams Fork and Verde rivers. It is estimated that there are about 70,000,000 board feet of yellow pine in the additions.

Cananea Sonora, Mexico

Dec. 9.—The mining outlook for this part of Mexico has been dimmed, at least to the extent of a shadow, by the financial disturbances of our neighbors in the great republic to the north of us. We are doing the best we can, although business and investments are not as active as they would have been had matters continued normal in the United States.

However, our Arizona friends are courageous and hopeful and appear to be pushing ahead to the best possible advantage under the circumstances.

The Cananea Herald, a large, well edited weekly journal, and in its sixth volume, suspended publication here last month indefinitely. It makes no apologies or excuses for going out of business, but just simply closed its doors to avoid a run.

Reports from Bisbee last week state that the Copper Queen and C. A. companies were not alone the victims of the mysterious fire and gasses, as on the Wednesday following smoke was seen issuing from the mouth of the shaft of the Shattuck Arizona and it was more than two days before the mine was finally bulk-headed enough to keep the flow of air from being sufficient to feed the blaze.

It is thought that the fire was in one of the stopes, although so far as reported the location of the blaze has not yet been discovered. In case it is in one of the stopes it is possible that thousands of dollars worth of damage will be inflicted before the flames can be finally conquered.

The poisonous gases which suddenly broke out in the Gardiner and Spray shafts of the Copper Queen and the Irish Mag shaft of the C. & A. Company were finally checked last week, the Spray shaft, where the last struggle with the poisonous fumes took place, being declared safe about the the middle of the week.

At the stockholders' meeting American, of the Cananea Eastern which was held in Bisbee Fridaynight, it was decided to pool interests with the Fay Cananea company. In speaking of the meeting the Bisbee Review says:

"At a meeting of the majority stockholders of the Cananea Eastern Copper Mining Company, held at the Copper Queen hotel, in this city last night, it was voted to consolidate the company's holdings in the Sonora copper camp with those of the Fay-Cananea Copper Company, on a basis that was not given out for publication. The transfer will go into effect as soon as the necessary legal papers are filed in Mexico.

"On last evening's train from the south J. J. Williams, superintendent of the Greene-Cananea smelter, P. J. Tehaney, the well known broker, and M. J. Thomas, arrived in the city from Sonora. Williams and Thomas were the original owners of the property, and Tehaney has since purchased an interest. The meeting was called to take place in the Copper Queen hotel, and was called to order shortly after 8 o'clock.

"The object of the meeting, which was to obtain an expression of opinion on the proposition of consolidating the Cananea Eastern holdings with those of the Fay Cananea, was then stated. It was finally voted unanimously to make the transfer.

"The ground involved in the transaction lies about sixteen miles east of Cananea and for sometime past has been considered to be valuable. During the past couple of years about 1,500 feet of development work has been done. Eleven cars of rich ore has been taken out of the workings and taken to the smelters.

"Some time ago the project of putting the ground into the Fay Cananea was proposed, the latter company having large holdings surrounding Cananea. The plan was looked upon favorably and the action last night was the result.

"The Fay-Cananea Company has been operating in northern Sonora for a long time past and owns several valuable groups of claims. It has lately been decided by the directors to retain L. Loranzer, a prominent mining man of Duluth, as general superintendent and he is on the ground at present in full charge of the properties."

At the meeting of the Mexican corporation, which took place here Saturday afternoon, it is understood the same decision was reached.

Again the state government came to the rescue of the merchants of Cananea when last week it was made known that the three per cent. sales tax, which the merchants have been compelled heretofore to pay, had been cut in half by both city and state government. This was the best that could be done under the circumstances, and follows a petition sent by the local Chamber of Commerce to Governor Torres, asking the total abolition of the tax for a period of three months.

A short time since Governor Torres caused the other tax collected from the citizens of Cananea by the state, to be cut in half, this arrangement following a meeting between the merchants and the city council with President Arnold presiding. It was at that time thought that the reduction would be enough to tide over the inactive local period.

This proved not to be the case and at a recent meeting of the Chamber of Commerce a petition was drawn up and the signatures of the merchants attending were appended, asking that the sales tax of three per cent. on all goods sold should be abolished for the period of a quarter of a year. On looking into the matter thoroughly the governor decided that it would not be wise to entirely abolish the tax for

the time asked, but granted this tax the same reduction which had been in force on other state dues. The city followed suit in the matter and it is now thought that with taxes cut to the minimum the merchants will be able to pull through the stringent period without trouble.

City of Mexico

December 5.—The Mexican states appear to be in good shape at the present time and we are building substantially for the future. Our mining interests are highly promising and our agricultural and commercial interests are much greater than ever before in the history of the republic.

The financial troubles in the United States have affected us to some extent, by delaying proposed investments of American capital, but we look upon the delay as only temporary, and as a nation, we are on a sound financial basis.

There has been no unnecessary extravagance in the general government departments since President Diaz became the chief executive. During the last decade Mexico has made marvelous progress in material development and the general betterment of the people. In the last twenty years approximately $900,000,000 of foreign capital has been invested in the various industries of the country, and it is still pouring in at the rate of $40,000,000 a year. We have vast resources inviting development and the government fosters legitimate investments.

Speaking of the city's growth, the Herald stated the other day that the roads leading to the more distant suburbs of this city evidence the increasing number of dwelling houses recently built in what would have been, only three or four years ago, the most unlikely places. Take, for example, the Tlalpam road, for centuries a lonely highway, with only at intervals, an adobe house, or the gate of some hacienda. Little by little, very recently, new and often creditable houses have been built, and it requires no prophet to predict that within five or eight years there will be a continuous line of houses on either side of the macadamized avenue between San Antonio Abad and historic Churubusco. Good roads, for which we must thank automobiles, are going to do wonders in extending the Greater City of Mexico out into rural spaces.

Suburban lots have continually risen in value, and hold their new level of prices remarkably well.

Much is due to the new sense of security felt by all dwellers in the Federal District. Formerly—and not so very long ago—the city ended sharply at Avenida Bucareli, then a mere common road bordered by vacant fields. The god Terminus set up his limits there to the southwestern extension of the capital. We look confidently for the coming of a time when, on all the foothills of the sierra, there will be casas de campo, and flourishing villages. Electric traction will enable this result to be attained. The suburban movement has only begun.

The architects, engineers and contractors met a few evenings ago in the great hall of the department of finance, in the national palace, more than 250 being present. The meeting was presided over by Lic. Justo Sierra, minister of public instruction, who has been appointed honorary vice president of the congress of engineers and architects.

Daniel Garza, the president of the provisional board, made a report on the organization of the congress. He explained that the first idea of the congress was conceived by a group of engineers, who read the comments made in different papers on the sinking of buildings in Mexico. They invited the engineers to the first meeting. The provisional board was elected, and he, being the president, had a conference with President Diaz, who offered the aid of the government in the work of the congress and in the establishment of an academy of engineers and architects.

Armando Santa Cruz reported on the organization of the congress. It was decided to elect a permanent board formed by three presidents, three vice presidents, three secretaries, three sub secretaries, one of these officials being elected among the members of each of three groups —civil and military engineers and architects. Also nine directors, three for each group. A treasurer and a subtreasurer also were to be elected. The term of the officials of the board of directors is six months.

It was also decided by the board that no verbal discussion would be allowed on technical and scientific matters, but that each member who wants to discuss a subject must present his opinion in a paper to be read at the meetings.

The officials elected are:

Architects—President, Mariano Tellez Pizarro; vice president, Ramon Ibarrola; secretary, Luis R. Ruiz; subsecretary, Genaro Alcorta; directors, Rafael Coyeneche, Luis Anzorena and Manuel Torres Torija.

Civil Engineers—President, Roberto Gayol; vice president, Manuel Marroquin y Rivera; secretary, I. Capilla; sub-secretary, C. Castro; directors, Ignacio Ceballos, Jose Aguilera and Angel Lascurain.

Military Engineers—President, Daniel Garza; vice president, Armando Santa Cruz; secretary, Francisco Prado y Tapia; sub-secretary, Ignacio Morena y Veitya; directors, Alberto Robles Gil, Gonzalo Carita and Alberto Olivier.

Ignacio Molina was elected treasurer and Francisco Garibay sub-treasurer.

Minister Justo Sierra retired from the chair and the new board was installed. Mr. Sierra made a short address complimenting the members of the congress, and referring to the great importance of the work to be undertaken by the congress.

A company with a capital of $2,000,000 will be formed in the near future which will absorb the properties of the Compania Colonia de California, Compania Colonia de Santa Cruz and the Compania de Torreno del Valle de Mexico.

This new company, which will be called the Compania Colonizadora de Torrenos en el Valle de Mexico, will acquire more than 6,000,000 square meters of land and some of the most important business men of the city are interested in the company, among them being Fernando Pimentel, Jacinto Pimentel, Louis Barroso, Carlos C. Cornejo, Gabriel Fernandez Somellera and Pedro Azcue. Some of these gentlemen were the owners of the Compania Colonia de California and of the Compania de Terrenos del Valle de Mexico.

The information of this new company practically means the continuance of Colonia Condesa up to Coyoacan. Preparations are already prepared so that there will be no delay in the commencement of the work of improvement of the land. The promotors of this enterprise have the support of some of the most able bankers of this city.

A meeting of the Compania Colonia de California was held yesterday afternoon at 4 o'clock at Ortega No. 28. The object of the meeting was to consider the advisability of transferring the entire property holdings of the company to the new company.

About ninety per cent of the stock of the company was represented at the meeting, and it was unanimously decided by the board of directors, consisting of Fernando Pimentel y Fagoaga, Carlos C. Cornejos and Jacinto Mimentel, that this transfer should be made. The Compania Colonia de California will be dissolved in consequence, and to that end Jacinto Pimentel and Carlos Cornejos were appointed receivers.

The land which the Compania de California will transfer to the new company is some of the most valuable in the valley of Mexico, being located between the city and Mixcoac.

Frank Risdon Moore, a mining engineer of the City of Mexico, discusses the difference between a hole in the ground and a mine, for the edification of the American investors.

"One thing the people of the United States should learn," says Mr. Moore, "is the difference between a hole in the ground and a mine. Judging from the number who are fleeced in mining propositions each year, there seems to be little likelihood that the lesson will ever be learned. It is a strange thing that men who would not invest their money in a shoe business or a manufacturing concern without knowing what the status of the business was, will sink hundreds of thousands of dollars in absolutely worthless mining shares. It may be the gambling spirit which is latent in all men and active in a large number of men, which causes them to invest blindly in stocks which may bring them fabulous wealth. There are others who invest money in good mining properties, but who are unwilling to wait until the ore can be taken from the mines. My experience is that men who invest with judgment and patience can find no better field than the rich mining sections of Mexico."

Investigation by American Consul T. D. Edwards has developed the fact that John W. Brown, the stranger who was found in a dying condition in the orchards east of Juarez and who later died in the hospital, was a well-to-do citizen of Central City, Colorado, the home of Senator Henry M. Teller. As soon as the American consul was notified of the death, arrangements were made for having the body brought across the river and prepared for burial.

Nagley and Kaster took charge of the remains and when the body was examined at the undertaking parlors, it was found that in addition to the sum of $6.10 which was found in the man's clothes at the time of his death, there were drafts from the First National bank of Central City, Colorado, amounting to $950.

The body has been embalmed and will be held at the undertaking parlors until definite advices are received regarding the burial from relatives whose names were obtained from letters in the pockets of the dead man. Brown was a man past sixty years of age, had gray hair and a long flowing gray beard and was fairly well dressed. The attending physicians in the hospital pronounced his death as being due to heart failure, caused by exposure, as he was found lying in a subconscious condition in the orchards with his clothes covered with mud, indicating that he had been there for several hours prior to his discovery.

Deadwood, South Dakota

Dec. 10.—More prospecting than usual is going on in the Black Hills and it bids fair to continue throughout the winter. Near Hill City the Continental Copper Company will do considerable exploiting on its Dakota-Calumet property, where some copper bodies were exposed a few months ago. The company believes that only a greater depth will assure the permanency of the copper body. At the 500-foot level a station has been cut, and from this point the diamond drill will be sunk. Most of the miners have been laid off pending the result of the drill work, which will probably determine the extent of the copper ledge in the lower workings.

Superintendent Arundel is preparing to start up the mill at the Lena property. He has completed the tramway and is now laying the pipes, which have just arrived.

At the O. K. property, Messrs. Klein and Burton have resumed operations for the winter. The main tunnel will be continued from its present depth of 100 feet to crosscut the ledge, which shows a nice body of free milling gold ore that requires development to make it pay.

Owing to the present lack of demand for tungsten work on the property of the Black Metal Company, where wolfram has been profitably mined for some time past, has been temporarily abandoned.

After many delays and three years of hard work on the part of the Hardins, the Branch Mint mill at Galena, eight miles southeast of Deadwood, has finally started. Next to the Homestake mills it is the largest in the Black hills and the most complete, costing over a quarter of a million dollars to erect, $70,000 of which went into the slimes plant. It is a stamp mill, containing 120 stamps, and has a total capacity of 800 tons of ore per day, with a cyanide annex.

The Branch Mint is a big proposition, having a monthly pay roll of over $10,000 for more than a year past. It controls 1,800 acres, has a four-mile railroad, operated with steam cars and locomotive by the company for the transportation of ore and passengers, and an unusually well developed mine that, in former days, was known as the Union Hill property, from which high grade ore was produced in quantity. The average of the ore today is about $4 per ton in gold, the treating cost being estimated at $1.10 per ton. The Branch Mint is owned by New York city capitalists principally, being built and financed under the direction of James D. Hardin, one of the veteran mining men of the Black Hills. About seventy-five men are employed on the property, and this number will be added to from time to time.

The new electric hoist at the Mogul shaft of the Mogul Mining Company, near Terry, has just been put into commission with satisfactory results. As it is of one compartment, it will be used for distributing men and material to different parts of the mine, the ore being hoisted from the other shafts. Heretofore the Mogul shaft was operated by air from the Mikado shaft. Since the completion of the new shaft, which gives greater access to the workings, the horses have been brought in from the valley, where they have been since the shutdown last January, and the work from now on will be increased. The new mill is treating about 300 tons a day, using the Moore process for treating the slimes, and is proving even better than the company looked for. Superintendent Manion reports the mines in splendid shape of development.

The money question has cut something of a figure with the Arcosta Mining Company, whose ground is in the Bear gulch district, to such an extent that they have been obliged to temporarily suspend operations. They have plenty of money in their treasury, but on account of the action of the banks, are unable to draw it in sufficient quantities to handle the work and at that many of the principal stockholders are bankers.

The company has been building a large hoist and are well along with the work. The banks in which their money is deposited will allow them to draw only $50 in cash per day and on this amount they cannot pursue the work as it should be. Consequently they have decided to suspend building operations until such time as their funds are available in such quantities as they may desire.

The Pioneer-Times declares that when the financial atmosphere is cleared the stock investors of this country may have learned a lesson that will inure to the advantage of Western mining securities.

Wall street is a great gambling house, and the recent tumble in the stocks which it handles has caused losses that have set those people who have been sedulously taught that mining stocks were risky securities to thinking. Already the conclusion is being rapidly reached that both min-

ing and industrial stocks that are handled on Wall street, being subject to manipulation, should be avoided, and the more widespread this impression becomes the more will the Eastern investor look to the West for stable securties.

Since it has been demonstrated that mining is a certain and reliable source of wealth, the statistics bearing on the subject going to show an enormous addition to the nation's wealth annually from this source, the only other problems are as to management and genuineness of property values. In past years the business of mining has been hurt by fraudulent operators. But two things have happened to remove the effect of the past offenses.

One is that Wall street has demonstrated its unsafeness and the West is waking up to the necessity of safeguarding the mining business. Everywhere laws are being passed and steps are being taken to protect the investor. These measures are bound to lead to contrasts. The West has no great clearing-house where millionaires can readily fleece the public by manipulating stocks. It offers chances for mining operations and the investment of capital in new mining enterprises which let the man with money into the management of company affairs. He does not have to place his money in the keeping of a Morgan or a Rockefeller or a Rogers. If he has capital to invest he can come to the West and go into the mining business on his own account, for mining development is going forward with such strides that there is always abundant opportunity. For the man with small means there is also safety and opportunity in the West. Mining stocks, carefully selected with a view not only to property value, but also to company management, are safe and remunerative. The public is finding this out, and the time is at hand when Wall street will be powerless to paralyze the Western mining business by withholding Eastern money from it when it is discovered that the money trend is westward.

From Custer come reports that despite the fact that the Westinghouse Electric Company went into the hands of a receiver during the recent Wall street flurry, there has been no abatement of work on the property of the company here. The factory is running as full as possible, while help is short. Ten new mica trimming machines are now being installed, which will greatly facilitate the work when in operation. A good sized force of miners is being worked in the mines and the mica supply is looking larger than ever, several fresh ledges being uncovered with recent work. The company is the largest employer here and shows no signs of diminishing its work during the winter months. The lack of help, both in miners and factory hands, which was so noticeable during the summer, has been somewhat relieved this fall.

Lead, South Dakota

December 8.—A week ago the Branch Mint mill at Galena was put in full operation with its 120 stamps dropping day and night. There are twelve sets of zinc boxes, each having six compartments, 18x24 inches and thirty inches in depth. It is one of the best equipped plants in the state and marks a great improvement to the business of the town.

An important law suit is in progress at Rapid City, entitled, "The Gertie Mining and Milling Company, et al versus Milton L. Moyer, before Judge Rice of the Circuit Court, Judge McGee and Judge Rice having exchanged circuits during the trial of this case, the former sitting in Belle Fourche.

Moyer secured an option on the Gertie mine from the former owner, E. C. Johnson, and has been working the mine on that option. A disagreement over the kind and the amount of work done caused the suit and a judgment in the sum of $1,000,000 is asked as damages. C. L. Wood, of Rapid, and E. W. Martin of Deadwood represent the plaintiff and Schraeder & Lewis, of Rapid, and C. F. Hechler and A. E. Oxenfeldt, of Philadelphia, the defendants. A large number of witnesses from Hill City and vicinity and mining experts from various places are at Rapid on the case, and the outcome will be watched by mining men generally.

Since the foregoing was written the case has been decided in favor of the plaintiffs on all the issues. The hearing consumed four days and was most ably presented for the plaintiffs by Hon. E. W. Martin of Martin & Mason, Deadwood, and Hon. C. L. Wood of Rapid City, Messrs. Schraeder & Lewis of Rapid City and Heckler & Oxenfeldt of Philadelphia, representing the defendant, M. L. Moyer.

A trial by jury was waived and all issues were left to be determined by the court, who early in the case eliminated the question of damages on both sides. The $50,000 damages claimed by the plaintiffs was not allowed as the contract did not expire by limitation until January 1, 1909. The $1,000,000 damages claimed by Moyer were dismissed by the court as absurd and the claim of $18,000 made by the defendant Moyer for the amount he claimed he had been induced to spend on the property by the fraud, deceit and misrepresentation of Mr. Johnson and other officials of the company, was not allowed because the court found no fraud, deceit or misrepresentation of any kind had been made by the plaintiffs to the defendant.

The court further found that Moyer now had no right, title or interest in the machinery which he had placed upon the property in accordance with the contract for which he had received full compensation from the Gertie company, according to the contract, although Moyer had set up in his pleadings that his brother really had bought and paid for the machinery and leased it to him to put on the property. The court made the temporary injunction against Moyer's selling or removing the machinery perpetual. The court further found that instead of Moyer having complied with the terms of the contract as alleged, he was in default and had forfeited all rights under it and decreed the contract cancelled, and that the 700,000 shares of the capital stock under option and in escrow in the First National Bank of Deadwood should be returned to Mr. Johnson as owner, and that the possession of the mine and mill should be returned to the Gertie company.

In summing up the case, the court administered a scathing rebuke to the defendant, Moyer, for the deception and falseness of his position in the case as disclosed by the evidence and his own admission under cross-examination. This seems to be a case of the shoe on the other foot. Usually in similar suits, mine owners are proved to have in reality misrepresented and deceived investors from the East, but in this instance the inference from the investor, Moyer, satisfied himself by mill tests as to the value of the mine and by not quite perfecting the milling plant so it would reduce the ore on a commercial basis, attempted to make it appear a failure and set up the preposterous claim of $1,018,000 for fraud and misrepresentation and asked for a judgment and sheriff's sale of the property entire, to pay it thereby to swallow up the property without paying a cent for it as per the contract.

After years of pluck and perseverance and the thousands of dollars spent by Mr. Johnson toward the goal of tin production at Hill City, the whole Black Hills will congratulate him on the outcome of this suit and realize that he is the real thing and the kind of a man no one can bluff or scare out of his rights by million-dollar damage suits and blackmailing threats.

A shipment of bullion from the United States assay office at Deadwood a short time ago was unique in the his-

tory of that office and caused considerable comment. It was the first time that it was considered necessary to send out the shipment under escort of an armed guard and this feature of the affair was the one that attracted the most attention. Col. Richard Bullock of Lead, who is the special guard employed by the two express companies to attend the shipment of bullion and who has for years acted in that capacity for the immense amounts sent out by the Homestake company, had the custody of the gold, which the local office transmitted to the Philadelphia mint several days ago. It is the policy of the government to keep these shipments as secret as possible until they have reached their destination and it is not the custom to make public the amount of bullion shipped at any one time, although the total amount for the year is finally published in the regular annual report.

The amount of bullion received at and shipped from the local office during the past three months has materially exceeded that of any similar period in the history of the office. If this record is kept up for the remaining nine months of the year the gold production for Lawrence county will be largely in excess of that of any twelve months since the United States assay office was established in this city. And there is every reason to believe that the present production will not only be maintained but that it will be very materially increased.

The mill operators of the county are generally willing and ready to ship their bullion to the Deadwood office, not only because they are interested in assisting it to maintain a good record but because they can secure quicker returns for their product. If they ship to Philadelphia, they have at least a week to wait before they can expect the return of cash, whereas when they deposit their bullion here they receive a check on the sub-treasury the following day, or as soon as the bullion has been weighed and assayed.

The reason for the expected increase of receipts at the U. S. assay office is the immediate prospect of additional production from the mills that have started within the past few days and the ones that are about to commence operations in the near future. The cyanide mills from which the local office has drawn its bullion during the past three months, are five in number, viz., the Golden Reward, Mogul, Imperial, Wasp No. 2, and Lundberg, Dorr and Wilson. The Branch Mint, Gilt Edge-Maid and Globe have commenced to crush ore and will be running at full capacity in the very near future. Long before the coming nine months have elapsed, the North Homestake (Maitland) and the Minnesota Mines Company should be in operation, adding five substantial plants to the five which have furnished the bullion for the past three months.

With ten mills in operation, ranging in capacity from 100 tons to 800 tons per day, the gold production of Lawrence county for the fiscal year now in progress, may be expected to eclipse all previous records.

Shoshoni, Wyoming

Dec. 11.—The Big Horn Power Company is pushing operations as rapidly as possible, and work will soon be in full swing on the great power dam to be constructed across the Big Horn river at Boysen, twelve miles from Shoshoni. Work on the foundation of this dam, which will create a lake seven miles in length and make possible the generation of 10,000 electrical horsepower is to be pushed during the winter and it is expected that before next spring's floods come down the foundation will be completed. The flood water will roll over the foundation during the summer months and the work of building the actual dam will begin next fall.

M. Hart, chief engineer of the work, and H. W. Crowell, representing the Ambursen Hydraulic Construction Company of Boston, have been in Shoshoni for several days, making arrangements for the beginning of work at the dam site. Six carloads of tools are now en route here and a shipment of forty foreign laborers have arrived. Orders have been placed for 150,000 feet of timber and every team available in this section has been leased for use at the dam site and in hauling materials and supplies in from the railroad at this point. Within two weeks 200 men will be employed.

The 10,000 electrical horse-power which is to be generated at the Boysen dam is to be used by the Boysen Mining Company, a corporation with a capitalization of $25,000,000, and by mining properties in the Copper Mountain and Birdseye mining districts and the towns of this region, including Shoshoni, Riverton, Boysen, Lander, Thermopolis, Arapahoe, South Pass, etc., and at no distant period railroads will cover this entire section of the state.

The people of Thermopolis are rejoicing over the announcement that the Burlington has decided to immediately extend its Kirby line southward and has appropriated $3,000,000 for the work. The terminus of the Kirby line is now twelve miles north of Thermopolis and the extension will pass through this town and southward into the Big Horn canon. When, a month ago, the Burlington quit work on the Kirby line, there was deep depression here, as it seemed that Thermopolis was to be left without railroad connection for an indefinite time. In preparation for the resumption of work, the survey between Thermopolis and the Big Horn canon has been re-located and changed in a number of important details.

State Geologist H. C. Beeler was in Denver a few days ago conferring with the officers of the Play Hill Gas and Oil Company, a Wyoming statute prohibiting the unnecessary waste of natural resources. The Play Hill company owns a gas well near Grey Bull which has been burning for several weeks. The officers promised the state geologist to take immediate steps looking to the capping of the well and the stoppage of the waste of gas.

The construction work of the Harriman lines, which was shut off so abruptly over a month ago, is being resumed just as fast as men and teams can be obtained.

Advertisements appear in Western papers for thousands of men for the contractors who are engaged by the Union Pacific to complete the work which was brought to such a sudden close a short time ago. Some of the work on which construction will be continued is:

The Lane cutoff, just west of Omaha, the biggest piece of rebuilding ever undertaken by the Union Pacific, will be pushed to completion with 400 laborers.

Twenty-five new locomotives for the mountain divisions have been ordered from the Baldwin works.

Nearly $1,000,000 worth of railroad ties are being assembled at the eastern terminals at Kansas City and Omaha for the double tracks which will be laid as soon as the grading is finished.

Orders for twenty-five new McKeen gasoline motors have been placed with the main shops at Omaha, the cost being about $375,000.

Kilpatrick Bros. & Collins, construction contractors for the Union Pacific, are advertising for thousands of men for resumption of construction work in Wyoming costing $4,000,000.

Altogether the work will entail an expenditure of ten millions of dollars. Some of the work is being pushed even though the winter weather makes it more expensive and difficult.

Tonopah, Nevada

December 7.—The Bodie (California) Miner states that it is reported on good authority that the Brock Syndi-

cate of Philadelphia has purchased the Mono Lake railroad, in Mono county, California, with about one hundred million feet of standing timber, and that the road will be broad-gauged and connected with the Tonopah and Goldfield line, now controlled by the syndicate, and made a part of that system. This plan will require the building of thirty-five miles of new road to connect the lines, extending from Miner, Nevada, to Bodie, California. In case the sale has been made, it means that the road will be rushed to an early completion. It also means a Santa Fe connection by way of Carters and West Walker, making necessary the building of a line from Bodie to such connection, or forty-two miles of road. It also means that the road will be independent of the Southern Pacific, and, above all, it means growth and prosperity for Bodie and the influx of outside capital to the mines of this section.

The management of the Nevada Northern Railroad Company has announced its intention to build a line to Goldfield and possibly other points, says the Salt Lake Tribune. One of the principal reasons for the extending of this line is said to be the desire of the smelting company at McGill to be within easy reach of fluxing ores for that immense plant, whose combined furnace power will be the largest in the world, reducing 15,000 tons of ore daily. It is learned that the railroad company will begin work on the extension of this line in ample time for its completion by the time that the smelter is ready to be blown in, and indications at the present time are that the Guggenheims are going to be an important factor in the construction of railroads that tap the larger camps of Nevada, and that Ely will be the center of all its Nevada smelting interests.

C. A. Higbee, secretary and treasurer of the Tonopah Mining Company, visited Goldfield last Tuesday, and left for Wonder yesterday morning to inspect the property of the Nevada Wonder Mining Company, of which he is president. He was accompanied by Ferdinand H. Graser of Philadelphia, secretary of the Nevada Wonder. From Wonder both gentlemen will proceed to San Francisco and thence to Philadelphia. Mr. Higbee stated while here that the Nevada Wonder is developing into one of the best mines in the state. On the 500 level the ledge shows a width of forty feet, with average values of $20 a ton. The mine has been a shipper from the surface.

In relation to calling a special session of the Nevada Legislature Governor Sparks a few days ago issued the following proclamation, which will probably put at rest the pessimistic clamor for that movement:

"After making diligent inquiry concerning the advisability of calling a special session of the Legislature at this time, for the purpose of revising the tax laws and extending payment to some future date from that now fixed by law, I will state that many letters and telegrams from members of the Legislature and business men of prominence, engaged in almost every calling, as well as my personal knowledge received in conversation with citizens throughout the state, all of whom have given undoubted statements concerning conditions now prevailing in their several counties, opinions differ according to individual judgment, but, no doubt, all have been honestly expressed and are entitled to due consideration.

"Careful comparison of the recommendations before me warrants the belief that the sentiment of the people is largely against calling a special session, and as this is a country where the majority are supposed to rule, all should bow to its will without complaint.

"To my mind the initial movement was too late to be effective, as many had already paid their taxes and were beyond the pale of relief, and ready in quoting the old maxim, 'equal rights to all and special privileges to none.'

"Special sessions of the Legislature are creatures of limited powers when on duty, and are restricted in point of time. Complications might arise that would do more harm than good at the present time.

"The people are alarmed over the existing financial crisis, but are hopeful for the future, and it is generally believed that the present depression will be but temporary if wise council prevails. It is but little over a year to come when a general session will be convened with full power to act deliberately, and do everything, and much more than a special Legislature could possibly accomplish at the present time.

"In view of the evidence submitted, I have decided not to call a special session of the Legislature, unless conditions arise later imperatively requiring it."

On Monday, November 25th, the Goldfield Consolidated paid out $658,450 in dividends, $360,000 being the monthly allotment of the merged corporation, $213,000 the Mohawk distribution, and $85,450 the Red Top "velvet." The $298,450 represented by the Mohawk and Rep Top dividends, however, practically all remains in the Consolidated's exchequer, the subsidiary stock having been nearly all absorbed by the consolidation. Owing to the ridiculous strike called by the disturbing element among the union miners, resulting in a general walkout, because payments were being made in scrip, which is as good as cash locally, the regular Consolidated dividend of 10 cents a month will be passed, although in the treasury there is sufficient money to take care of the monthly declaration for six months, while the output of the company's two mills has been about $132,000 per month. Before it was closed by the walkout, the Mohawk had ceased to mine any high grade ore for the market, confining its energies to increased development of its territory.

The famous Mohawk-Combination lease, whose term will expire on November 30th, wound up its pyrotechnic career on November 25th, having up to that date extracted all the shipping ore blocked out to its bottom levels and the limited time being a bar to further sinking. The Mohawk was a merger of the Ish-Sheets lease on the Combination and the Kalfus lease on the Mohawk, the apex dispute between which finally resulted in the perfection of the merger to be known as the Goldfield Consolidated Mines Company, which purchased the Combination. This lease made its shipment, 294 tons, during the week of June 29th, and its total output to and including the week of November 23d was 16,101 tons of quartz that averaged in value about $90, the total being worth about $1,500,000. In addition, there are left on the dumps 12,000 tons of dirt that can be sorted to run $30 a ton, the pile possessing a value of about $360,000, just the amount of one month's Consolidated dividend.

Second greatest of all the camp's producers, from the tonnage standpoint, is Jumbo Extension, which since June has sent to market 18,812 tons of ore, the last shipment having been made from the Mohawk-Jumbo lease on the Wedge Fraction in October, since which time the outflow from that property has been plugged by the apex and boundary dispute between Jumbo Extension and Consolidated. Frances-Mohawk lease No. 3 on this fraction is drifting on the 550 level along a likely ledge and is crosscutting southeast at 520 feet depth for the extension of the Mohawk Jumbo's pay shoot. Some little high grade ore has been tapped.

The richest carload of unsorted ore ever sent out of Goldfield was a recent lot of forty tons consigned from the Annex lease. The carload of rock, loaded just as it was broken from the ledge, was found to be worth $37.920, averaging $948 a ton. It came from the 340-foot level. In the first three weeks of its shipment this great lease cashed in $150,-

000 worth of ore. Free gold quartz has now been uncovered on the 400 level and it is expected to be exposed shortly by laterals on the 500. The Annex management is also exploiting the old Watson lease on the Florence, where $70 assays have been obtained recently.

James E. Keelyn, representing the majority stockholders of Chicago, last week took forcible possession of the Little Florence lease on the Florence, and is now at the helm, assisted by his personal representative, Frank Oliver, once in charge of the Florence proper. The Chicago crowd has ousted Dr. W. H. Robinson, against whose management there were divers complaints on numerous counts. The lease has continued piling up $200 to $300 ore from the 400-foot level at the rate of seventy-five tons daily until there is a $500,000 accumulation in storage, which may possibly be left for treatment by the company mill. This most gratifying revelation of the last few days on this lease was the cutting of the shipping ore at a depth of 625 feet, where a thirty-foot vein averages $50 per ton.

Sixth best among the Goldfield tonnage producers from the week of July 6th to and including the week of November 23d is Diamondfield Black Consolidated, whose output for that period was 130 tons. The McKane lease on the Black Butte Consolidated's Quartzite claim produced something like $500,000 from a ledge that faulted at the 180-foot level. The rich shoot has been recovered in the Black Butte Company workings on the Black Butte claim of the group, making ore in quantity that runs upward of $100 a ton. Fourteen inches of a ledge in company diggings at another point samples $800 to $1,000 a ton, and blocked out at various places are thousands of tons of ore worth an average of $50. The Diamondfield Black Butte Consolidated promises to climb nearer the top of the production ladder in 1908.

Tiring of the restraint placed upon them by the smelter trust and anxious to again place Nevada's mines upon their old basis, the principal mining men of the state, representing aggregate wealth to the extent of nearly $70,000,000, met at the Overland hotel last night and discussed the feasibility of erecting an immense smelter and mill near this city. It is even reported that it was decided to begin work on the big project at once and carry it to completion as rapidly as men and money can do so.

The meeting was attended by Wingfield, associate of United States Senator Nixon and head of the Goldfield Consolidated Mines Company of Goldfield; Frank Keith, general manager of the Tonopah-Nevada Mines Company of Tonopah; Martin Effinger, general manager of the Pittsburg Silver Peak Mines Company of Blair; Walter Dowden, general manager of the Nevada Goldfield Reduction Works, and Charles Worden of Berkeley, who has extensive mining interests throughout Nevada.

Not one of the men who attended the meeting would make a statement. "No, I am not in a position to deny the report that we met this evening to discuss means of erecting a mill and smelter to handle Nevada ores in defiance of the smelter trust," said Martin Effinger in response to a question as to the purpose of last night's meeting. Beyond this he refused absolutely to discuss the matter. "It was just an informal affair and we are not in a position to discuss what took place," said another one of the party who had just come from the meeting.

Colorado School of Mines Has Successful Year

The trustees of the Colorado School of Mines have submitted their annual report to the governor of the state, in accordance with the state law governing state institutions. The report shows that since December, 1906, the school has received $135,489.13 and expended $144,743.20. Tuition fees and deposits received from the students show an increase of $7,048.45, and the school has enriched by gifts to the extent of $7,682.75. In April of the present year, the Colorado Legislature made an appropriation of $35,000 for the addition of a new building to be used as a gymnasium. The contract let for the new building requires $38,000, with an additional expense of $13,175 for the equipment of the interior. The deficit in the state's appropriation will be made up by graduates and friends of the school. The gymnasium will be within 600 feet of the athletic field and contain the most modern appliances. The building will stand two stories high, with a fifteen foot basement for bowling alleys, swimming pool, shower baths and lockers. The ground floor will be devoted to offices, club and trophy rooms, while the gymnasium, 50x700 feet, will occupy the third floor. The structure is already well under way, $12,000 being expended, and will be ready for use May 1, 1908. At the opening of the present school year, work in an actual mine, located on Mount Zion, was instituted as part of the curriculum. Many types of machine drills are being used and tested.

The faculty consists of six professors and four instructors. A course in English has been added to the list of studies with particular reference to reports on mines and business correspondence. Graduate courses in mining, and metallurgy have been added, thus conferring upon the school the tittle of Colleges of Colleges.

It is the intention of the board of trustees to ask the Legislature to set aside money for an ore testing plant, the plans of which are being drawn. Manufacturers will donate their various types of machinery, and the plant will be equipped with all modern machinery, for preparing ores and extracting the values from different ores. Ore sent in will be subjected to the various methods and the percentage of extraction determined by the students.

The attendance this year totals 329, of which thirty-eight are from different universities and colleges. About fifty-eight per cent, are registered from Colorado with free tuition, the remainder paying $100 per annum. After September 1st, 1908, the tuition fee will be raised to $150. Next to Colorado, rank Illinois, with seventeen students; followed by New York with ten; California, nine; Pennsylvania, eight; Ohio, six; and Indiana, 5. The school confers the degree of Engineer of Mines and Metallurgical Engineer, and ranks high among the mining schools of the world.

The term "mesh" refers to the number of apertures or openings per linear inch of the screen. The diameter of the wires and the size of the openings for a given mesh are practically the same, hence the word may also be considered as meaning the number of wires per linear inch. Under these conditions the screening area is twenty-five per cent of total area of the screen.

The completion of a copper converter charge is told by the color of the flame, which is usually a pale green. The time of pouring, however, has not been studied as much as in steel making. The subject is being made the subject of investigation by mining school seniors this year.

One mine superintendent of Park City, Utah, gives as a reason for his preference of flat hoisting ropes, over round, the ease with which wear on the rope or a broken strand may be detected. For the same depth, however, a round cable weighs less than a flat one.

The usual percentage of nickel in a nickel-steel rail is about three and one-half per cent.

Movements in Mining Camps of World

Only Authenticated Reports Will Be Admitted to These Columns

ARIZONA

Cochise County.—According to Superintendent Byron M. Pattison of the Shattuck-Arizona and the Denn-Arizona companies work will be discontinued on both properties with the exception of diamond drilling on the 1,100-foot level of the Denn shaft.

Gila County.—The Saddle Mountain Copper Company has secured a $1,000,000 mortgage on its property at Christmas and the Saddle Mountain district for the purpose of discharging its indebtedness and creating an operating fund for a rise in the copper market.—It is understood that an extension for its final payments due next year and amounting to almost $500,000, will be secured by the Globe Consolidated. This will permit its large plan of development to be carried out.—The Arizona Commercial Company has let a contract for sinking the new three-compartment shaft at the Black Hawk mine. A shaft is being sunk also on the Eureka claim adjoining the Black Hawk.—The Arizona Commercial Copper Company has resumed work in sinking its three-compartment shaft at the Black Hawk mine. It is now down about twenty-five feet. Work will be done by contract at great saving in expense.—The usual activity is also reported from the Superior & Boston National Mining Exploration and other companies operating in the district, as well as from upper and lower Pinto creek.—National or local financial conditions have so far not affected any of the Globe district companies, and the companies, among them the National Mining Exploration, announce that they will have currency and coin with which to pay their employes next month.

Mohave County.—An extensive strike of rich copper is reported in a crosscut from the 120-foot level of the Enterprise mine, east of Kingman.—The Tennessee mill at Chloride requires another machine to work the intermediate grades of ore from the crushers. A fine product is being turned out with jigs on tailings from the big dumps.—The mill of the Arizona-Mexican Mining and Smelting Company at Stockton hill is producing a high grade of lead concentrates.—Allen F. Muter will operate on the tailings of the Mack mines with the cyanic treatment.—At the mine of the Arizona Southwestern Copper Company an adit drift is being run on the vein which will cut a body of copper ore at a depth of several hundred feet. The company is building a trail from the Eshom ranch to the mines in Crow canyon.—The big tunnel of the Expansion Gold Mining Company in the Union Pass district is being pushed rapidly ahead with machine drills.—The Franconia Mining Company has sunk a 100-foot shaft on its mines in the Buck mountain section on which a whim has been put up and work is in progress to the 200-foot level. Four feet of ore in the bottom of the shaft assay better that $11 in gold to the ton.—A force of men is now employed at the McCracken mines, which will be increased with added accommodations.—John C. Potts and L. Kimberly have bonded their Thumb Butte group of gold mines to Foster and Murphy of Memphis, Tennessee, who have established a camp and begun active development of the property.—W. A. De Liere has uncovered a promising vein of copper on his property near Brownville the outcrop showing rich values for several hundred feet.—Perkins, George and Clack, who have a lease on the Little Chief mine, at Stockton Hill, have run into a body of very rich silver ore and are getting it in shape to begin stoping.—A mining company is making preparation to work the placer mines of Frank M. Barnes, near the old Temple Bar property, north of White Hills. It is understood that the bars and low ground will be worked with a dredger.

Pinal County.—On the Two Queens property, shaft sinking and tunnel driving are proceeding with unabated energy.—Four tons of ore averaging $100 to the ton in silver and lead were brought to Tucson recently from the Swastica mine in the Olive camp district owned by the Swastica Mining Company, and will be shipped to the Deming smelter as soon as a carload is made up.—The Cumberland Ely has decided to abandon its option on the Jupiter group in which the Challenge claim is included. The property was bonded two years ago and the final payment was due on the twenty-fifth of November.—The Alta Mining Company of Mineral hill has its new drill plant and hoisting and pumping apparatus installed and has begun sinking on the Black Copper shaft.—The Pinal County Gold Mining Company, whose properties are situated on Mineral creek, this county, has let a contract to Fred Pike and Dick Herndon for development work. One of the properties is situated south of Ray and the other a short distance north of Kelvin.

Santa Cruz County.—Ore carrying gold, silver, lead and copper is being shipped to the El Paso smelter from the mines of the Sultan Gold Mining Company under lease to C. S. McHenry of Los Angelse and A. Hoover of Nogales.—The Mansfield company is showing no sign of being affected by the financial situation as work and is going ahead with usual activity. The Sweet mine is being sunk by contract to the 550-foot level and ore is being placed on the dumps from the 250-foot level. Good shipping ore is being taken from the Black Cap and sent in frequent consignments to the El Paso smelter.

Yavapai County.—It is reported that the Monica Mines Company has purchased a new mill, consisting of a ten-stamp crusher, concentrator and cyanide plant. The Monica mines, fourteen miles from Kirkland, have been opened to a depth of 1,100 feet and drifts and raises on the veins show good and continuous values.—The United Verde Copper Company has reduced the wages of its employes to the same level as before the raise in November, 1906. Up to the present the company has curtailed its force by 300 men.

Yuma County.—At the Big Horn mines eight feet of water have been found at a thirty-foot depth. Between forty and fifty prospectors are at work near the Big Horn property on which thirty feet of development work were done recently.

CANADA

British Columbia.—The Rossland Miners' union has agreed to the reduction in the wage scale almost to that which was in effect before July 1st. Accordingly the mines will not shut down as feared.—The smeltermens' union at Trail has also accepted the lower wage scale.—Steam will be substituted by electricity for pumping at the Dominion Copper Company's Brooklyn mine, near Boundary.—The C. P. R. has finished putting in the new spur for the Granby company at the Gold Drop-Curlew claims, adjoining the Showshoe mine, from which a large tonnage will be sent when the mines shall have resumed operations.—Another car of ore has been shipped

from the Duncan mine, near Boundary, up the West Fork.—At the Mother Lode, Deadwood camp, a force of sixteen men is now employed.—Full forces are reported to be working at the Freemont and Strathmore mines, with encouraging results.—Work has started at the Crescent mine, Skylark camp, with ten men under Superintendent M. I. Feeney, where drifting at the 300-foot level is proceeding.—A dozen men are at work at the Jewel mine, Long Lake camp, drifting and raising being done at the 120 and 330-foot levels.—Numbers of the fifty-ton ore dumps, ordered by the C. P. R. many months ago, have arrived in the Boundary, and are now awaiting the reopening of the mines to be placed in use.—The Westinghouse electric locomotive, for use at the 400-foot level of the Granby mines, will be used in connection with the Victoria shaft when matters are ready for operation.

COLORADO

Boulder County.—The Roman Eagle Mining Company has awarded a contract for the driving of the adit level of the Roman Eagle mine from the present breast, which is 240 feet from the portal, an additional 100 feet southwesterly towards the Thunderbolt shaft.—The Spencer Mountain tunnel at Eldora has been driven southwesterly 1,000 feet and thence an equal distance in a southerly direction, with about a mile of drifting on fifty veins, opening large ore bodies which on the installation of an economical milling plant will bring a substantial profit to the owners.—The Enterprise tunnel of the Swarthmore Consolidated Mining Company is being driven at the rate of thirty feet a week with Ingersoll drills under the direction of William Gartrell.—Since the recent strike at the Fourth of July an extra force has been added.—An additional shift has been put on the Revenge since the cutting of the ore shoot in the 500-foot level.—Shipments from the Denver tunnel in Chittenden mountain show values from $28 to $40 in gold.—The Homestake, on Puzzler hill, has been sunk to a depth of 125 feet, ore running $55 to the ton being now taken from the 100-foot level, and will be sunk an additional 100 feet.—The mill of the Golden Slipper Mining Company, which has been idle for several years, has been reopened with a new plan of treatment, the ore being milled without a roast. About twenty-five tons or ore from the Golden Slipper and the old Puzzler mine will be treated daily.—It is reported that the Modoc company in the Ward section is contemplating the addition of a cyaniding plant to its mill.—Clark and Bryant have placed a plant of machinery on the Last Chance mine in the Nederland district.—The initial run of the Pollock mill at Salina will be made December 15th.—Williams and Knight are operating the Little Fred, near Sunshine, for New York parties with a view to installing a milling plant.—The roaster at the Wano mill at Jamestown has been repaired and the big mill has resumed operations.—It is reported that the Fortuna Dyke at Summerville will be worked again about the first of the year.—Manager W. B. Le Veque will hereafter lease the Richmond mine at Salina to experienced miners on royalty.—The Golden Chest at Sunset will resume in January.—A 200-foot siding is to be run to the Blue Bird mine from the main track of the C. & N.—The Tiger Eye at Sugar Loaf has been unwatered and drifting on a large vein at the fifty-five foot level is in progress.—Twelve leasers are working over the old stopes of the Chrisman Logan near Crisman.—A test run of thirty-two tons of ore from the Concord, made at the Gladys mill last week, gave a ten-ounce retort and three tons of concentrates, or a saving better than $10 per ton.—Manager Lake has installed a new plant of machinery on the Lone Tree tungsten mine, and is sinking a shaft in a good body of ore.—The Eureka group on Bald Mountain, at Caribou, belonging to the Up-to-date Mining Company, is being developed by a crosscut tunnel now advanced 150 feet from the portal, and designed to cut at depth or from 100 to 1,000 feet not only the veins of the Eureka group but to furnish a means of ingress and egress for all the great mines of the Caribou system on Bald Mountain.

Chaffee County.—A forty-foot vein of galena and lead carbonate, averaging $40 a ton has been encountered in the breast of the Tom Paine tunnel in Jenning's gulch, near Salida, owned by the Peerless Mining and Milling Company. The tunnel is in the mountain 942 feet.—A crosscut which has been driven on the Manitou has passed through a five-foot vein of low grade ore.

Clear Creek County.—The high grade vein encountered in the Riley lease on the Sunburst has widened from four to six feet with no decrease in values.—An eight-inch streak of heavy lead ore, assaying $70 to the ton, and a three-foot body of quartz sprinkled with hessite carrying $440 in gold have been uncovered by Jones and company, leasing on the Corwin or Commonwealth vein through the Tobin tunnel. A heavy tonnage of ore is being broken and a carload shipment is soon to be made.—The Maud S., on Douglass mountain in the Georgetown district, operated under bond and lease by Michael Kelly, has been cleaned out and retimbered and driving will soon be resumed. A shipment of ore runnig close to 200 ounces silver to the ton besides a percentage of lead has been made from the shaft which is down about 150 feet.—E. E. Grubb and company have taken a lease on the Annie May property on Columbia mountain, belonging to the American Mines Development and Investment Company, and will drive the adit tunnel which is now in seventy feet.—The Montezuma-Queen Magnet Consolidated Mining and Milling Company, now being organized with a capital of $3,000,000, by Colorado and Ohio parties, has secured the Magnet group of claims in the Georgetown district, a group of ten claims on Independent mountain at Montezuma, and the Queen group of four claims in Spring gulch near Idaho Springs.—It is understood that one or two Hathaway mills will be installed in the Kelly plant of the Democrat Mountain Mining Company to effect a saving in silver and gold values.—John Hite is following an ore shoot measuring from six to ten inches in width at the bottom of a thirty-five-foot shaft on the Stemwinder property on Columbia mountain, and is sending out sulphuret ore milling from 175 to 325 ounces silver to the ton.—The Kennedy Gold Mining and Milling Company, operating on the Centennial vein on Leavenworth mountain, has uncovered a rich streak six to eight inches wide, showing liberal samples of gold in the pan at a depth of eight feet from the surface.—Manager Frank Percy of the St. Regis tunnel, near Idaho Springs, states that the company is considering the installation of a compressor plant.—The Big Five Company has advanced its Central tunnel a distance of over 6,000 feet with a vertical depth of about 1,000 feet, making it the second longest tunnel in the county.—The Seeman tunnel was driven fifty-two feet in the month of November, making the total distance driven 1,681 feet. The tunnel will penetrate the James peak mineral zone.—The United Hydro Electric Company of Georgetown will supply power for the new compressor plant for the Two Brothers tunnel up Virginia canyon.—Work will be resumed in a few days upon the holdings of the Tam O'Shanter Mining and Milling Company, situated on Young mountain in the Atlantic district.—Owing to the insufficient supply of water, the com-

pressor plant at the Sidney tunnel has been closed down.

Gilpin County.—The Cissler shaft in Russel gulch has been retimbered and enlarged and will be sunk 200 feet deeper in this winter, being now down to the 180-foot mark.—Denver parties leasing the Pride of the West mine, Central City, will institute about $2,500 worth of development in sinking and drifting.—Three carloads of tailings from the Golden Flint, near Perigo, sold at the Argo smelters for more than $24 to the ton.—Shipping ore is being extracted from the 300-foot level of the Gulch mine in the Lake district.—Harper and company have commenced operations on the Williams mine in Lake gulch.—The Jenny Creek Mining and Milling Company, owning a group of fourteen lode claims and one placer claim in the Boulder Park section, with a capital of $50,000, will build a mill and install a large plant of mining equipment.—The Chamberlain-Dillingham works in Black Hawk have been receiving exceptionally large shipments of high grade ore during the past few months.—Inami and company leasing in the 555 east level of the East Notaway mine in Russell gulch have shipped twelve tons of their second-class ores to the sampling works in Black Hawk, and they are getting out a lot of first class ores of about ten tons which will be shipped inside of the next few days.

Gunnison County.—The Maroon Mountain Mining and Milling Company is opening a large contact on the western slope of the Maroon mountain, showing extensive outcrops on the surface.—The shaft of the Midnight Mining Company at Bowerman, now down to a depth of sixty feet, will be sunk an additional 120 feet before crosscutting for the vein.

Hinsdale County.—B. N. Ramsey has secured the Monte Queen and Buckeye properties near Lake City, under bond and lease.—The Crown Point is to be driven 100 feet under contract. Jack Atkins and partner have located a vein measuring from twenty-five to thirty feet in width on Henson creek, assaying sixteen and one-half ounces silver, one-half ounce gold and six and one-half per cent. yellow copper.—The compressor on the Donnelly property in Alpine has been frozen up and hand drilling will be in progress until spring. The tunnel is in 1,158 feet and in close proximity to the big vein which is fifty feet wide on the surface.—The Hinsdale M. & M. Company are cutting into a big vein in the T. C. M. property at a distance of 935 feet in the crosscut tunnel at a depth of 600 feet.

Mineral County.—The output of this county for the month of November was 3,410 tons, being a little over half the production of the previous months.—The Humphreys mill closed down on the first of the month but will resume about the fifteenth.—Three Card concentrating tables have been installed in the Amethyst mill. At the mine an electric light system is being put in.—The Ridge mill has resumed with new rolls.

Ouray County.—The Calliope mine, which was shut down for a few days, owing to the financial situation, has resumed work.—After the first of the year a small force will be employed for the remainder of the winter at the Treasury Tunnel mine on Red mountain, where the workings are now over 5,000 feet in length.—George Huriburt and Frank Sanders, working on the Bachelor, near Ouray, drove their tunnel 110 feet in the past month.—At the St. Paul on Red mountain, about twenty-five men are employed and two carloods a week are being sent to the smelters.—The Gold Mines and Power Company is engaged in hauling their new water wheel, compression, dynamo and Temple-Ingersoll electric drill from the station at Elk Park to their property.

San Juan County.—A large force of men is excavating for the foundations of the Henrietta mill at Gladstone, the machinery being ready for shipment.—The Telescope Mountain Mining Company has struck a vein of ore running $75 in gold and silver to the ton, with a trace of lead. Contracts have been awarded for the immediate installation of compressors and drills at a cost of $4,500.

Summit County.—The Abundance tunnel near Breckenridge has been reopened and will be driven to a depth of 3,000 feet.—In the breast of the fifth level of the Silver Wave mine in the Montezuma district, a fourteen-inch streak of smelting ore, said to run from 700 to 1,500 ounces silver to the ton, has been encountered.—At the Silver Princess a double compartment shaft will be sunk which will connect three levels of the property.—The Montezuma Milling and Transportation Company is remodeling and enlarging the Old Bullion mill.—The Rothschild Gold and Silver Mining Company will drive its tunnel a half-mile beyond the 4,700-foot point, encountering thirty-two veins, one of which is forty-seven feet wide and another having an estimated value of $8,000 to the ton in ruby silver.—It is reported that Nelson and associates, operating on ground beside the Wild Irishman and Montezuma Chief have exposed a body of ore several feet wide practically at grass roots.—Late assays obtained from the Moscow show eight to ten ounces silver and from thirty-three to seventy per cent. lead, or an average value of $50 to the ton.—Three additional claims have been taken over for the Montezuma Chief Mines Company, making a solid group of nine in all.—The main tunnel of the Tip Top mine, owned by the Colorado-Toledo Mining Company, is being advanced in ore at the rate of four feet a day.

Teller County.—Morris brothers, leasing on the Morning Star claim at Cripple Creek, exposed a body of ore from three to five feet wide, assaying from $16 to $26 to the ton, while prospecting in the old stope above the 250-foot level.—The Standard Leasing Company, operating on the South Burns of the Acacia Gold Mining Company, has resumed operations, and shipments are again leaving the mine.—Due to energetic pumping by both the Strong and Portland mines, water has receded from the 1,500-foot level of the latter and development work on that level is now being pushed.—Becker & Travell, leasers on the Christmas mine, Bull Hill, shipped during November 250 tons of $30 ore.—C. L. Amsden of Colorado Springs has secured a two years lease on the Mohican Gold Mining Gompany's property on Bull Hill.—The Elkton Consolidated Mining Company shipped 250 tons of $35 ore early last week.—On December 3rd the Little Clara lease on the Work Mining and Milling Company's property made of its regular semi-weekly shipment a $15,000 consignment of ore.—Another lease has this week been granted on the Stratton's Independence.—The British American Mining Company last week shipped from its Dante mine on Bull Hill a seventy-five-ton lot of $30 ore.—The output of the district for the month of November was 46,300 tons of ore of a gross bullion value of $1,091,050.

The figures as reported by the accredited representative of the mills and smelters are as follows:

Plant.	Tons.	Average value.	Gross value.
Smelter.	3,600	$60.00	$ 216,000
U. S. R. & R. ..	21,000	27.00	567,000
Portland.	10,300	23.50	242,050
Isabella.	3,000	6.00	18,000
Ironclad.	3,000	2.00	6,000
Phoenix.	2,400	2.50	6,000
Other plants	3,000	12.00	36,000
Totals.	46,300		$1,091,050

The Regal Mining and Development Company, a New York corporation, controlling and operating 120 acres of mining property on the west slope of Cowan mountain, has decided to build

a cyanide mill on the property which will have a capacity of fifty tons and will cost $10,000 to erect. Samuel Jensen is general manager for the company.

CALIFORNIA

Inyo County.—Shipments of rich ore are soon to be made from the Southern Belle near Bishop.

Madeira County.—In the Minaret district choice locations have been secured by prospectors but owing to heavy snowstorms which have occurred operations will be postponed until spring.

San Bernardino County.—The Ord Extension Gold Mining Company, recently organized by Los Angeles and Pasadena capitalists, has purchased seven claims in the Ord Mountain district, south of Dagget, from A. C. Casey and James Mulcahy.—The Malachite Copper-Gold Company is reported to have sold its holdings in the Ord district to Los Angeles investors.—Capt. J. B. Osborn has resumed operations on his property in the same section and has put up a whim on the Aztec gold claim. Good ore has been encountered at the 100-foot level in the property of the Ord Mountain Gold Company.—It is reported that William Wilson of Goldfield, B. T. Hoggart and L. P. McGarry of Rhyolite have bought a group of eight claims in the Old Woman mountains, fourteen miles from Danby station, from which ore has been taken reaching as high as seventy per cent. lead and twenty per cent. zinc. The consideration was $75,000. It is asserted authoritatively that the Crucero smelter at Crackerjack will soon be erected. The Crackerjack News states that a custom mill is to be erected at once on Bonanza mountain to work the rich ores now being extracted from a number of properties in that rich district.

MEXICO

Chihuahua.—Lewis Roberts of Colorado and associates have denounced thirty pertinencias on a portion of a large dyke which shows low values in gold, near the city of Chihuahua.—At the Calabacillas mine, owned by the Cabacillas Mining Company and situated in Western Chihuahua, over $1,500,000 worth of $20 gold ore is in sight. The first unit of a twenty-five ton mill will soon be in operation.

Durango.—The new 100-ton combination cyanide and concentrating mill of the Inde Gold Mining Company, near Inde, has been completed and is now in operation.—Two men are known to have been burned to death in the fire in the main shaft of the Reforma mine at San Juan.

Guerrero.—It is reported that a rich strike has been made in one of the mines for which the Mutual Trust Company is fiscal agent, at Taxco, and that there are at present twenty-five men at work on the property. An assay of the ore shows a value of $163.52, which amount per ton has been offered at the mine.

Mexico.—It is reported that the upper tunnel in the Genovesa mine in Zacualpam, is in good ore and that the company is now preparing to commence extraction. The prospect for an ore body of good value is favorable. Sorted ores run as much as ten kilos of silver to the ton.

Oaxaca.—According to the annual report of the American Consolidated Mining and Milling Company, issued by A. W. Cunningham, president and manager, on October 1, 1907, it is stated that in spite of the fact of the delay in receiving machinery which was ordered early in the year 1,000 feet of work has been completed during the year. As the railroad has only been graded and made ready for the ties between Taviche and direct connection with the smelter in Oaxaca, and on account of delay in completing this line, the mining company has been compelled to have wagons especially made to haul machinery to the mines. The El Orden shaft is down 366 feet and at the 400-foot depth a drift will be run to the Benjamin and Escuadra veins. The three-compartment shaft at La Cruz is down 240 feet, and a station is being cut in to begin drifting on the vein. The shaft at the Esperanza is down 130½ feet. At 150 feet a station will be put in and a drift run to two veins on the east.

Sonora.—The Cananea Eastern Company has consolidated 498 pertinencias of copper-bearing property, situated on the southwest slope of the Ajo mountains with the Fay-Cananea company. About 1,000 feet of tunnel development has been done on the ground and ten cars of ten per cent copper have been shipped from one ore body.—According to President Hoffman, the Democrata mine will treble its output when it is reopened. Some development work will be done during the depressed period.—The Los Alisos mine located in the Tabatacochi district, has been sold by James Moran, Frank Moson and D. H. Johnston to Edward E. Kelly of Los Angeles. The mine, worked steadily for two years, has secured the owners a good profit after paying all expenses.

Zacatecas.—A concession has been obtained and a site purchased for a modern 200-ton smelter by a mining company operating in the Zacatecas district under the name of Negociacion Minera de Magistral, S. A. The site lies at the end of the company's tramway from the mines to the railroad siding of the Mexican Central. D. H. Norris, of the company management, is now in the United States for the purpose of purchasing the necessary materials and machinery and upon his return, it is stated, ground will at once be broken for the construction of this smelter.

NEVADA

Churchill County.—From the Truett lease, at Rawhide, $1,500 worth of ore is said to have been taken from a fifteen-inch vein at a depth of fifteen feet in one day recently.—The shaft on the Anderson lease is down sixty feet.—The Grutt brothers are extracting ore that runs near $1,000 a sack. About 100 leases are being operated in Rawhide.—S. B. Crane of Reno, has been offered $40,000 for his group of five claims in Rawhide.

Esmeralda County.—Goldfield's production for the week ending November 30th, was 3,570 tons at an estimated value of $354,230.—The Goldfield Mine Owners' association has passed a resolution declaring that the mines of that camp will remain closed till such time as the financial crisis is past, and local labor troubles have been adjusted to the satisfaction of the members of the association, and until the smelters will treat Goldfield ore at a reasonable rate.—At the adjourned meeting of the directors of the Goldfield Consolidated Company it was reported that all the properties of the big company as well as the mills had been closed down.—Manager Effinger of the Blair mines at Silver Peak announces that 100 stamps will be dropping in the mills by January 1st. Twenty stamps are now in operation.—The Cactus mines and milling plant of the Newhouse Mines and Smelters Corporation at Silver Peak, are to be resumed.—The Boston Consolidated properties at Garfield are also ready for business again, and ore is being shipped from the porphyry deposits to fill the 30,000-ton receiving bins of the new 3,000-ton milling plant at Garfield.

Humboldt County.—The Baumberger strike at Gold Circle is improving with development and ore is being sacked for shipment. It is understood that the owner will erect a custom mill to work the high grade ledges of the district.—On the claims of Storey and Johnson, about four miles east of Gold Circle, a wide ledge has been exposed containing rich values.—Menking and Schen have uncovered ore running $100

a ton.—It is estimated that over 1,000 men are working in the hills around Farrel.—A sample taken from the Wild Cat group recently assayed $1,000 to the ton.

Lincoln County.—While catching up the cave-in which occurred three months ago in the east drift of the New Year's Gift claim of the Duplex mines, a new streak was discovered which contains ten feet of milling ore and various pockets varying from a few inches to a foot in thickness and running into the thousands in free gold. The new forty-horse-power hoist has been installed on the original Searchlight claim of the property.—After eight months of delay the full equipment of the Colorado Mining and Milling Compnay has arrived and is in process of installation. The equipment consists of two engines, two pumps and two motors.—The Leroy Mining and Milling Company, operating the Pompeii, has ordered a ten-stamp mill from the Ridon Iron Works of San Francisco. Pumping has been suspended owing to the breaking of the suspending chain of the ten-inch Cornish pump which had lowered the water in the shaft thirty-eight feet in two hours and had practically unwatered the shaft.—The Blossom mine now has both the Searchlight and the Cyrus Noble mills dropping on ore which is coming from the stopes above the 200-foot level.

Nye County.—Tonopah's production for the week ending November 30th, was 6,859 tons, at an estimated value of $279,730.—The Tonopah Consolidated Company is employing between seventy-five and 100 men and is making daily shipments of about 100 tons from the Noonday, where work is being concentrated.—Several leases have been let on the Hidden Treasure at Silver Bow.—John W. Brock of Los Angeles has taken over a large interest in the Tecopa Consolidated. The Tecopa output has been cut to sixty tons a day since the Salt Lake smelter refuses to take more than that tonnage for three or four months. A spur from the T. & G. Railway will be built to the mines as soon as possible. A twenty-ton stamp mill will be erected on the Mayflower ground as soon as the financial stringency is over.—The plant of the Manhattan Ore Reduction and Refining Company is saving better than ninety-five per cent. of the gold contained in the Consolidated ores, of which 1,000 tons are to be treated before handling ore from other mines.—The Mustang Mining Company is soon to resume work in its mines.—Gurnee, Garside and Jurgenson have sunk a shaft on the Crescent-Eureka property to a depth of 180 feet at a maximum cost of but $2,600.—Besides its new mill which will be running in a few days, the Nevada Ore Refining Company has ordered a twenty-five ton sampler which will take small lots of any grade ore.—The Toquima Copper Company has resumed sinking with the freeing of the water in the shaft.—The Montgomery-Shoshone has shipped $125,000 in bricks during the past six weeks. The Keane Wonder mill is producing from $15,000 to $20,000 worth of bullion every month.—The Taylor Engineering Company of Chicago, has offered to put up at Bullfrog a 100-ton custom mill if sufficient ore is guaranteed to keep it running.—The Mayflower has struck water at a depth of 500 feet and the ore is richer than ever.—The building of a custom mill at Springdale which has been projected for some time by Rankin and Nowcomer will be started in a short time.—The Del Oro Mining Company at Johnnie is installing a hoist on its property.—Col. Frank McCann and associates have taken an option on the Juliette group of claims situated in the Funeral range abou twenty miles west of Rhyolite.

White Pine County.—The Old Whitney mill of the Boston-Nevada Company at Osceola, which had been idle for over five years, is now running in first-class order and is grinding on fifteen tons of high grade ore daily. On the Cumberland properties which were acquired several months ago, twelve men are being employed.—The Lead King Mining Company has sent its third carload of ore consisting of 22,500 pounds of seventy per cent lead ore, carrying values in silver, from its holdings on Duck creek to the Salt Lake smelters.—Guy and Bud Gallagher, while running a cross-cut to tap the ledge on their property on North Duck creek encountered sand carbonates thirty-five feet from the mouth averaging eighty-one per cent. lead, six ounces silver and $1.75 in gold, to the ton.—Before closing down, fifty feet of fine iron sulphide ore had been plowed through on the Chainman near Ely.—M. C. Fay of Cherry Creek has transferred to F. A. McDermell of Cherry creek, for a stated consideration of $5,000, a fourth interest in the Chief of the Hills mining claim.—John Bews has transferred to William H. Fillmore of Cherry Creek, for a stated consideration of $100, a fourth interest in the West Extension of the Star mine, in Cherry Creek mining district.—W. M. Nesbit, James F. Potter, D. Higbie, Harry Randall and C. A. Higbie have transferred to the Great Mammoth Mining & Milling Company the Mammoth group of ten claims in the Eagle district, this county.

NEW MEXICO

Grant County.—Ten wagons are employed handling ore from the rich strike at the Laura to Duncan, whence it is shipped to the Copper Queen smelter at Douglas. The vein is twelve and one-half feet wide in the bottom of the shaft. There are five stations now cut in the mine, and in drifting to the south another of the very rich ore shoots has been uncovered.—The Twin Peaks Mining and Milling Company is extracting high grade ore from the main shaft with a force of ten men. A new sinking pump and other machinery has been installed.—Los Angeles syndicates have recently combined and have started work on the Pinon and other claims. They have put on about ten men to start with and have let a contract for sinking a 100-foot shaft.—The injunction proceedings instituted by the Bessemer Copper Mines Company of Fierro against the Colorado Fuel and Iron Company have been dismissed to the satisfaction of all concerned.

SOUTH DAKOTA

Custer County.—The Hartwell Mining Company owning about 200 acres southwest of Custer, is operating on a vein forty feet wide consisting of a hornblende schist intersected by seams and stringers of quartz which average $12.45 in gold, mostly in the free state. Six shafts have been sunk, the deepest being sixty-five feet.—The Custer Peak Mining Company has completed a twenty-ton Chilean test mill, which will treat ore from a cross ledge on Chicken ridge sixteen to eighteen feet wide and containing values of from $4 to $8 free milling.

Lawrence County.—The Imperial Mining Company has transferred its milling operations from its present mill to the Dakota plant in the First ward, as it has been found that a more economical extraction can be obtained in the Dakota mill.—It is reported that the Puritan Mining Company, whose mine and mill are located in Strawberry gulch, is contemplating resuming operations in the near future.

Pennington County.—The Hymalulu Mining Company, owning 220 acres of ground on Slate creek, near Mystic, has accomplished about 450 feet of tunnel work and a fifty and seventy-foot shaft, the latter at the apex of Mt. Hymalulu disclosing a nine-foot ore body assaying from $2 to $21 a ton.—A large and important tract of mining property in the Rochford district has reverted to the original owners, Kearney, Billups and Swanson, of Rochford, from the Ohio-Deadwood Mining Company, which after installing machinery six years ago abandoned the ground with but little development and payments have been overdue for two years.

Personal

R. Alvin Weiss, a prominent mining engineer of New York City, was in Denver this week on mining business.

D. Chisholm of the firm of Chisholm. Mathews & Co., of Colorado Springs, is spending a few days in the city.

S. G. Martin, superintendent of the Tom Moore Gold Mines Company at Eureka, Colorado, has returned from New York City.

Captain Henry I. Seemann, president of the Continental Mines, Power and Reduction Company, Idaho Springs, Colorado, is in the East.

M. Sidney of the Sidney T. T. M., M. & P. Co. was in the city a few days ago from Georgetown, Colorado, where he has extensive mining interests.

J. P. Simon of Superior, Wisconsin, is in Colorado investigating the Quail mine at Montezuma, the property of a company of which he is president.

Alfred Carr, general manager of the Gold Mountain Consolidated Mining Company, has returned to Kimberley, Utah, from a business trip to New York City.

J. E. Stewart of Resort, Idaho, was in Denver recently purchasing equipment for the Rapid River Reduction Company, of which company he is manager.

A. H. Ristedt of Idaho Springs was down from that busy town this week and laid in some Christmas presents. He says Clear Creek county is booming along in good shape.

J. M. Platt of the engineering force of the American Smelting & Refining Company has been appointed mine superintendent of the Cia. Minera La Quimica y Anexas, at Sultepec, Mexico.

D. B. Gilles and J. G. Ormsby of Tonopah, Nevada, stopped over a short time in Denver on their way East. They say Tonopah, Goldfield and the other Nevada mining camps will soon be in better shape than ever.

C. C. Perkins was up from Durango, Colorado, last week. He says the mining interests of La Plata county are in good shape and the coal output is heavier than ever before in the history of the county.

J. Meyer, until recently smelter superintendent of the Saddle Mountain Mining Company at Christmas, Arizona is to leave for New Zealand in a few days. He is now visiting friends at the Golden School of Mines.

John A. Topping has resigned as Chairman of the Board of Directors of the Tennessee Coal and Iron Company, and the office has been abolished. George C. Crawford, general manager of the plants of the National Tube Company, has been made president of the Tennessee company.

E. A. H. Tays has resigned as general manager of the United Mining Company of 100 Broadway, New York City, and is now in no way connected with that company. He left Denver December 1st, for San Blas, Sinaloa, Mexico.

Felix Cremer, formerly with the Guanajuato Amalgamated Gold Mines Company, La Luz, Guanajuato, has accepted a position as ore buyer with the Cia. Metalurgica y Refinadora del Pacifico, S. A. Henry W. Edwards has also taken the field as ore buyer for the same company.

The Hon. John Kennedy, of Ouray, was a welcome caller at the office of Mines and Mining this week. Mr. Kennedy is a member of the state senate from that district and a well-known mining man of Ouray county. He says they are going right on over there just as if there had been no Wall Street breakup or other interruptions. You can't keep a rich mining section down with disturbances that the West had no hand in starting.

George L. Wright of Ouray has been in the city for the past ten days on mining business. He is interested in the old U. S. Group of mines, located about half way between the famous Camp Bird mines and mills. The U. S. properties have been developed by several thousand feet, and Mr. Wright says they are now in a large body of lead-silver ore which he proposes to develop and equip as it deserves. The main crosscut intersects the vein in a distance of 600 feet about 900 feet deep. Mr. Wright is confident the old U. S. group will make a great mine, and he has been in the business long enough to know what he is doing.

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Obituary

Childs M. Priddy, a pioneer of Leadville and one of the most prominent and wealthiest citizens and business men in the Cloud City Camp, died yesterday from pneumonia, aged fifty-seven years. Mr. Priddy was born at Pekin, Illinois, and is survived by a widow and one son. The funeral will be held under the auspices of the Elks.

John Thode, a pioneer of Carbon county, president of the Thode Cattle Company, one of the oldest and richest live stock concerns in the West, and county commissioner for several terms, died at his home in Laramie Saturday from kidney disease. Thode came from Germany in 1874 and went to work for the Missouri Pacific as a section hand. He was subsequently made foreman of a construction gang. He saved his money and later embarked in the cattle business, in which he grew wealthy. He is survived by three sons and one daughter.

The Cost of the Government

The secretary of the treasury sent his estimates to Congress a few days ago, of the appropriations required to carry on the government for the fiscal year ending June 30, 1909. The figures show an increase of $77,479,819 over the estimates for 1908 and an increase of $56,220,646 over the appropriations for 1907, this last item, however, including deficiencies and permanent annual appropriations.

The estimates submitted by the Isthmian Canal Commission for the fiscal year 1909 aggregate $33,183,143. Appropriations for the current fiscal year amounted to $27,161,367.

A great machine is this government. A few years hence and its cost will reach a round billion dollars annually.

One good thing about it, the vast sum goes back into circulation among the people from whence it comes.

	Estimates for 1909.	Appropriations for 1908.
Legislative	$ 12,962,847	$ 13,190,007
Executive	423,710	425,000
State Department	4,147,481	3,847,850
Treasury Department	$174,778,106	177,783,502
War Department	218,111,526	182,106,207
Navy Department	128,846,260	102,886,051
Interior Department	183,911,769	188,389,786
Postoffice Department	2,597,880	2,781,520
Department of Agriculture	14,359,351	14,539,581
Department of Commerce and Labor	16,214,783	14,939,653
Department of Justice	9,884,580	9,517,109
Grand totals	$766,508,273	$710,287,626

Discussion and Opinion

Our Readers are Cordially Invited to Use This Department for Making Inquiries or Giving Publicity to Their Ideas

NOT PRACTICAL POINTS.

To the Editor of Mines and Mining:

Probably many of your readers have noted the articles entitled "Some Practical Points for Prospectors," by Matt Alderson, running in the current issues of the Mining World. They have interested me exceedingly, not because they "impart knowledge which even a professional mining man might memorize to advantage," to quote the editorial in the Mining World of August 3, 1907, but because Matt Alderson is either a man far in advance of his time or else he doesn't know the first principles of geology. After reading his articles several times and weighing his premises, with supporting arguments and conclusions, I am forced to decide it is the latter and that he jumped to the study of ore deposits without regards to physical geology, drawing upon his fertile imagination for any desirable changes in the earth's crust.

Alderson's theory of ore deposits is briefly this: He presupposes all ores to be deposited by springs upon the surface of the ground and the layers of ore covered by the ejectimenta of a volcano to almost any depth desired. If more than one vein is formed, this process is repeated any number of times. In order to get the vertical position of the ledge, he supposes the edge of the volcano to break or fall in, carrying the layer of ore with it.

In presenting this theory Mr. Alderson first says that the present accepted theory is false and that its "very complexity proves its falsity." Then he says, "Let us use our eyes, let us exercise common sense." In deducing a premise such as his, he could not have made much use of his eyes as he himself admits, due to the absence of the proper kinds of volcanoes, and as to the use of common sense, does it show such to presume that at one time there existed volcanoes which could accommodate a cubical piece of ground, with a mile or more for each dimension? Moreover, would a block of ground upon breaking over retain the relative position of its parts, which it must, to result in a vein such as I have seen cutting across country without change of direction for over a mile? His theory is complexed only in the number of assumptions he makes.

It is evident that the author of the articles mentioned has not studied the geology of Butte, nor has he weighed the suggestions made by eminent geologists as to how a deposit of several feet in width may be made from a small water channel a few inches wide. This is shown when he states that soft precipitates could not make room for themselves by lifting a half mile of rock. The finding of copper at great depth in gold, silver and lead mines does not exactly support his theory of "once a gold mine, always a gold mine," but rather shows that the accepted theory of the precipitating and crystalizing action going on at depth has good foundation. He also makes some unique comparisons, such as the sides of a laboratory beaker to the walls of a vein. The only places he seems to have studied closely are some Montana mines and the geysers and hot springs of Yellowstone National Park, with perhaps a little too much study on the latter. Genesis of ore deposits is by means perfected, but certainly Mr. Alderson's theory does not straighten the matter out, and the only value it can have is to show how far and fast a man can go when he jumps at a conclusion and then sets out to prove it, neglecting all contrary evidence. It is not my purpose to disprove his statements for that would require more time than I can devote to it just now, but to call forth expressions from authorities on this subject so that in case an uninformed man has accepted his views, he may see the error. Also, to suggest that a mining paper, when publishing such articles should make it plain that they by no means, present the best views on such a subject.

Perhaps some who have not read these papers are wondering why a lengthy discussion of a poorly proved theory of ore deposition should be brought in under the head of "Practical Points for Prospectors." I have been guessing myself, but do not know. The first six articles were good advice to any prospector taken as a whole, but the sequence in arranging might have been better. The ore deposition exposition takes up about nine articles and in the fifteenth, he returns to ground which is more familiar to him, and where because of his experience it is hard to go wrong. If, as I stated in the forepart of the article, Mr. Alderson is a man far ahead of his times, he should prepare a book on the physical geography of the country before we knew it.

I am very desirous of hearing the views of others on this subject for I may be wrong.

RENNECK TREBOR,
Denver, Colorado, December 8, 1907.
Box 1403.

Regarding Assessment Work

To the Editor of Mines and Mining:

Dear Sir: I wish to disagree with the position taken by Mr. Smith in your last issue on the assessment question. As a reason of my advocating relief by Congress to the prospector from doing the annual assessment work for 1907, required by the government, I will say my attention was first attracted to it by the monetary conditions in Nevada, where at that time in the whole state of Nevada the banks, with possibly one exception—and that bank had but few depositors, most of them wealthy—were closed so far as securing coin and currency was concerned, and the Western Federation of Miners, which organization was generally recognized throughout the state, refused to allow their members to accept anything but gold, silver or currency, and the Western Federation of Miners still holds to the rule then laid down. It goes without saying that great sums of money are even now tied up in the banks with only a small portion of it available for assessment work, or for any other purpose, as, according to the dictum of the Western Federation of Miners, who control the labor situation of the entire state, certificates will not be accepted by any member.

In California the money situation was similarly stressed, as shown beyond all question by the action of the government of that state in calling a special session of the Legislature to extend the time of payment of taxes for a term of months to relieve the unfortunate financial conditions there existing. The man who had paid his taxes in California for December, did not object to granting his neighbor relief by way of extension of time.

While in Colorado and some other states the financial situation was not quite as bad, comparatively, as in the farther West, yet it has affected many and stopped work on numerous large enterprises and delayed, hindered and stopped innumerable smaller ones. In the meantime winter is on and in the high altitudes one cannot get anything like value received for the money re-

quired to be expended at this season of the year, and in scores of cases, work is now entirely impossible. There are thousands of prospectors, many of whom have expended years of energy and every available dollar on their properties who will lose their lives' labors and the hope of sustenance in old age, if relief is not now obtained from Congress. I am of the opinion that an extension of time for doing the work until the thirtieth day of June will answer the purpose and perhaps give better satisfaction and be as quitable as to suspend the assessment work for this year.

In many parts of the country it would be much beter for the prospector to have the official year end on the thirtieth day of June in regard to doing assessment work, as it does with the Government in making all of its annual reports.

This would be especially agreeable in the desert country, in parts of California, Nevada, Arizona, New Mexico, Utah, and some other parts. In the arid country water in the winter in most places is expensive and almost impossible to get, whereas in the spring and early summer it is an ideal season for work, with water easy to secure.

In the high altitudes of snowy countries it is expensive and a great hardship to do the assessment work late in the season; the ground is frozen and in many places the snow is heavy; pack trains have moved out of the country and it is almost impossible to acomplish any good.

If Congress should not feel like granting relief by suspending the assessment work for 1907, it might be willing to extend the time for doing the same until June 30, 1908. From the present outlook it is my impression the latter would be preferable.

The fact that some men have completed assessment work for 1907 is not a semblance of argument against the proposed act, but is palpable evidence of an unkind spirit toward a less fortunate neighbor. The act will certainly give relief and it will not injure.

Readers of this article who are interested in the bill might advance its interests by writing or telegraphing at once to members of Congress with whom they are acquainted, or, at any rate, with those from their own state, requesting the pasage of the same, either for suspending the assessment for this year or extending the time in which to do the same.

Personally, I have done thousands of dollars' worth of assessment work this year and am finishing the balance of work required by the government and giving contracts by which work will be continued during the whole winter.

I took this question up at the request of those who were financially unable to meet the requirements of the mining laws. I am,

Very respectfully yours,

W. F. KENDRICK.

Denver, Colorado, December 11, 1907.

U. S. REDUCTION & REFINING CO.

The executive committee of the U. S. Reduction & Refining Company has decided to omit the payment of the quarterly dividend of 1½ per cent. on the $3,945,800 preferred stock which ordinarily is payable on January 1st. the stock is six per cent. non-cumulative.

President Hawkins, of the United States Reduction & Refining Company, has issued the following circular to stockholders in connection with passing the preferred dividend: "Your company is in a sound financial condition and is treating a satisfactory tonnage of ore, though at somewhat reduced charges, owing to competitive conditions referred to in the last annual report.

"It is believed that the preferred dividend will be earned during the current quarter but as the competitive mill will soon be rebuilt and ready to again enter the market for ores, and as its management has a declared policy of cutting the rates for treatment, it becomes necessary to maintain your company in a strong position to meet conditions and to still further reduce the treatment charges if necessary to maintain its position.

"Your directors have the fullest confidence in the ultimate outcome of the situation and believe that the results will be the same as in the case of numerous other similar undertakings, all of which have been short lived.

"The business of the U. S. Smelting Company, owned and operated by your company, has been affected by prevailing industrial conditions. Its product—zinc lead pigment—was fully contracted for, but its customers have found it impossible under present conditions to take and pay for the stock of finished produce ready for market upon which it cannot realize for the reasons stated.

"It is alsc carrying a large stock of ores and supplies. Owing to the large amount of money required to continue operations, under prevailing market conditions the plant has been closed temporarily and until its stock of finished product can be disposed of. It is expected that this will be accomplished by February 1, 1908, or soon thereafter; but in the meantime and until conditions change, your company must maintain itself in a strong financ.al position.

"All things considered, the outlook is encouraging for an early resumption of dividends."

AMERICAN SMELTING & REFINING COMPANY.

The decision of the directors of the Amalgamated, to still further curtail the production of copper, will have little effect upon the American Smelting & Refining Company.

It is estimated that the gross sales of the smelting company aggregate from $125,000,000 to $150,000,000 per annum. Of this amount at least $100,000,000 is derived from the handling of gold and silver. Lead is the company's next largest product, then comes copper.

The copper output of the company under present conditions, runs about 3,000 or 4,000 tons a month. Accepting the highest figure, this would make about 50,000 tons a year. Figured as low as ten per pound, the output would amount, in value, to $10,000,000; at twelve cents the value would be $12,000,000. Thus the American Smelting & Refining Company's copper business is shown to amount to less than ten per cent. of its total.

The company does not directly own a single copper mine. It receives its ore from several hundred small produsers and treats it usually on a commission basis. If conditions in the copper trade keep the price or the metal below the point where a profit may be derived from its production, more mines, particularly those with low-grade ore, must shut down. It is hardly likely that this will go so far as to reduce by more than twenty per cent. the smelting company's receipts of copper.

Based upon these figures the effect of continued poor conditions in the copper industry it not likely to be felt by the smelting company to a greater extent than two or, perhaps three, per cent. of its earning capacity.

The value of the silver shipped from Cobalt district, Ontario, in 1906, was $3,667,551 for 5,336 tons, or an average value of about $687 per ton. The production for 1907 will probably be i nthe neighborhood of $8,000,000.

Rutile is found in America principally in Magnet Cove, Arkansas, and Graves Mountain, Georgia. It occurs in the older crystalline rock, such as granites, schists and gneisses and also in marble or metaporphosed limestone.

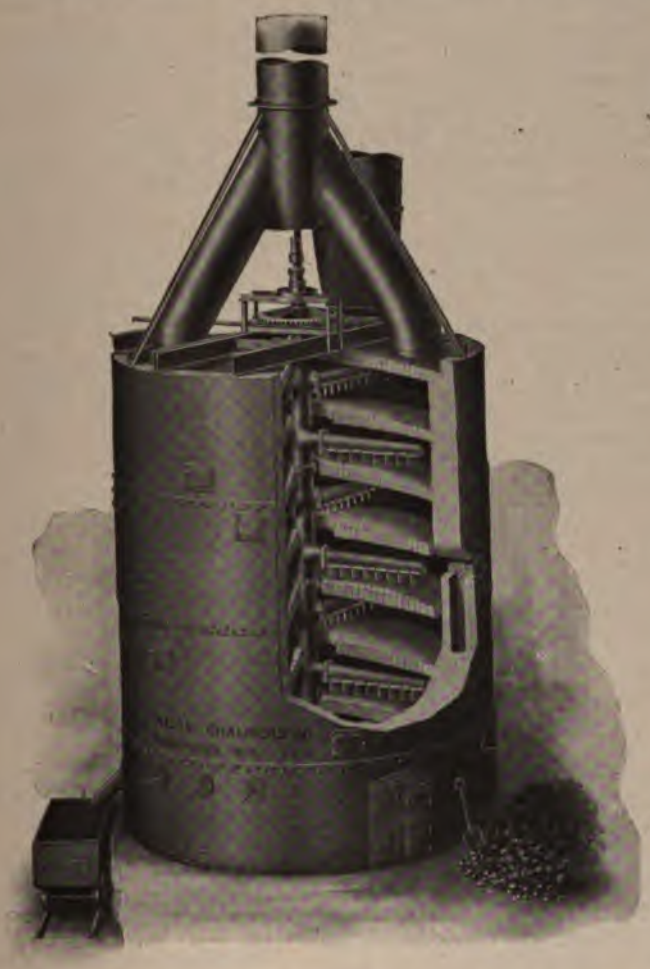
MACHINERY AND EQUIPMENT

Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.

M'DOUGALL ROASTING FURNACE. —INCLOSED FIRE BOX TYPE.

The McDougall Roasting Furnace is adapted to the roasting of heavy sulphide ores, those that may carry little combustible matter, or, in fact, any ore or material where the roasting process must be carried on by the addition of external heat.

The furnace is designed for large capacities, discharging a "sweet" roasted product of thirty to one hundred tons in twenty-four hours, depending upon the amount and the molecular arrangement of the substances to be eliminated. The furnace consists of five or six superimposed hearths. The general construction is similar to the standard Kelpetko-McDougall furnace, having all of the valuable features of the latter with modern improvements. It is built by the Allis-Chalmers Company of Milwaukee.



McDougall Roasting Furnace Inclosed Fire Box Type.

The main difference between this furnace and the standard furnaces used in treating the heavy sulphide copper ores is that under the sixth hearth, counting from the top, there are two fire grates which have one general combustion chamber. This chamber extends under the entire sixth hearth; the hot gases arising from the combustion of the fuel, either coal, wood or oil, are carried out and up through separate flues with three hot gas flues, which are arranged at 120 degrees from each other. The capacity of the flues that lead to any one hearth is sufficient to carry the total gases arising from the combustion of the fuel, so that by the aid of dampers, any portion of the heat can be applied to any one of the three hearths. As an illustration, we would apply seventy-five per cent of the heat to No. 6 hearth, fifteen per cent to No. 4 and ten per cent to No. 2, or vice versa. Or, we could apply all of the heat to any one hearth, depending upon the actual requirements.

The firing of the coal is done in the same way as with a boiler. The doors and ash pit are similar. The grates are of the ordinary stationary boiler type. Shaking grates can be substituted, if desired. The ore is fed into the furnace from the automatic feeding device, the same as used in the regular McDougall furnace. The feed hopper can be charged with overhead tracks and cars or with an elevator. These hoppers are made any required size, so as to hold from five to twenty tons. The ore is discharged from a spout at the side into calcine cars, or, if it is to be treated by the cyanide process, this spout can discharge on to a cooling conveyor that carries the material to the tanks or bins.

The driving machinery is mounted on the top of the furnace; thus being readily accessible for oiling and adjusting. The bearing at the bottom of the shaft is reached by a manhole, and, as the shaft itself is water cooled, there is no danger of the bearing becoming hot.

This furnace is adapted for a large class of ores that have heretofore only been treated in the straight-line furnaces. There are many advantages embodied in this furnace that are not in the straight-line type. Its compactness, accessibility, ease of operation, the control of the roasting through the various hearths and the small amount of heat lost by radiation are features which enable ore to be roasted at a minimum cost for fuel and other operating expenses.

Some of the finest specimens of zeolites in the world are found in Colorado. They occur in small cavities of the basalt flow on North Table mountain near Golden.

Two advantages of open pit over underground mining (in addition to the cheapness of handling the dirt) are the increased efficiency of the powder and the fact that the work of the men can easily be watched.

THE STOCK AND METAL MARKETS

Colorado Springs

Dec. 11.—Following were the quotations at the close of the change today:

Mines.

Stock.	Bid.
Acacia	05½
C. C. Con.	03¼
C. K. & N.	05
Dante	05½
Dr. Jack Pot	06
Elkton	46
El Paso	30
Fanny Rawlins	05½
Findley	38
Gold Dollar	05⅞
Gold Sovereign	04⅛
Index	01
Isabella	23
Jack Pot	03¾
Last Dollar	02
Lexington	....
Mary Cashen	....
Mary McKinney	25
Mollie Gibson	....
Moon A	01¾
Old Gold	02⅝
Pharmacist	02⅝
Portland	94
Prince A	....
Vindicator	75
Work	16½

Unlisted.

Stock.	Bid.
Golden Cycle	40
Jennie Sample	....
Jerry Johnson	05
U. G. M.	05

Prospects.

Stock.	Bid.
Agnes	....
Alamo	....
Banner	01
Blue B	02
Bob Lee	005
Buckhorn	0075
C. C. & M.	....
Coriolanus	....
Creede	....
Des Moines	....
Gold Bond	01
Gould	....
Hart	....
Ida May	01
Jolly Jane	0075
Keystone	....
Little Bessie	....
Little Nell	009
Little Puck	01
Mary Nevin	01½
Mountain Beauty	06¾
New Haven	006
Pilgrim	01
Princess	003
Raven	009
Republic	007
Requa Savavge	03
Robert Burns	....
Rose Maud	01⅝
Rose Nicol	....
St. Thomas	....
Teutonic	01¾

Miscellaneous.

Stock.	Bid.
Anchor	0015
Black Wonder	....
Blanche	003
Cable Con	005
Colo. G. C.	....
Easter Bell	....
Fauntleroy	....
Favorite	001
Flower of West	005
Golden Age	....
Goldfield	....
Gold Hill	....
Goldstone	....
Grace	....
Greater G. B.	....
Hayden Gold	002
Hummer	003
Key West	001
Kimberly	....
Kitty	....
Lucrative	0025
Marion	....
Matoa	007
Mariposa	003
Marquette	....
Missouri	005
Montreal	005
National	008
Nellie V.	003
O. K.	004
Olive Branch	002
Palace	....
Pinnacle	003
Pointer	....
Progress	003
Pythias	....
Red Spruce	002
Tenderfoot	004
Texas Girl	004
Uncle Sam	002
Volcano	....
Wide Awake	001

Boston

Dec. 10.—Following were the quotations at the close of the exchange today:

*Stocks.	Bid.
Adventure	2
Arcadian	3½
Allouez	24½
Atlantic	9
Bingham	4⅜
Boston Con	9⅝
Balaklala	2⅝
Butte Coalition	13½
Calumet & Hecla	600
Calumet & Arizona	94
Centennial	24
Copper Range	53
Daly-West	8¾
Franklin	7
Granby	75
Isle Royale	16
Mass	2¼
Michigan	8½
Mohawk	46
North Butte	37¾
Old Dominion	25
Osceola	82
Parrot	9
Quincy	78
Shannon	9¾
Tamarack	60
Trinity	13¼
United Copper	7¼
U. S. Smelting	34¾
do pfd	37½
Utah Cons	28
Victoria	4½
Winona	4
Wyandot	60
Wolverine	110

*Otis & Hough.

New York

Dec. 12.—The number of consumers who are entering the market for copper is increasing each day. This indicates that the supply in the hands of the consumers is as low as it can get.

A representative of a large producing company says there are few, if any, copper companies in the United States that are making a profit on copper. It is well known that the Butte mines are producing copper at a loss. In view of this, it would not be surprising if there was a further curtailment, as producers do not care to take out of the ground valuable copper reserves and dispose of them at figures representing a loss instead of a profit.

As one producer put it, "it looks like taking gold dollars out of a bank and creating a market for them on a basis of 80 cents apiece. The Butte mines are now operating in the neighborhood of 33 per cent. of their capacity, and no increase can be expected until buying orders are received in much larger volume than at present. It would not be surprising if the December production was even less than the output reported in the month of November.

A prominent copper interest said: "Many people seem to think that the margin of profit on copper at the present time ought to be as wide as it was during former periods of depression. They do not seem to take into consideration the fact that copper mines in former depressions produced almost as much copper as they did when the demand was brisk. This is the first time in many years that the copper companies have been forced to curtail their production to any extent, and cost of productions, therefore, is very much higher than it was when the mines were in full operation. I should say that the cost of production is now from 2 to 3 cents a pound higher than it was during any of the depressions in recent years.

It is pointed out that Europe is now pretty well stocked with copper and cannot be regarded as a large source of outlet for many months to come. A large amount of the copper sold to Europe was purchased by speculators, and any rise in the metal above the prices paid for it, it is believed, will be followed by a liquidating movement which would tend to depress prices abroad as well as in this country. This, of course, all depends upon consumptive demands. If there is a large increase in the demand on the part of legitimate consumers, it will not take long to absorb the available stocks in this country as well as in Europe.

Shipments of copper abroad in the month of November reached the record breaking total of approximately 75,000,000 pounds, which was at the rate of about 900,000,000 pounds a year, or nearly twice the annual rate at which copper is now being produced in this country. It is believed, however, that copper shipments to Europe will show a falling off from now on.

Following are the quotations:

Stocks.	Close.
Amelgamated Copper	45¾
American Smelting	69⅝
American Smelting, pfd	91
Colorado Fuel & Iron	19¼
Anaconda Copper	27½
Republic Steel	16½
National Lead	40
U. S. Steel	25⅞
U. S. Steel, pfd	87
General Electric	113½
Utah Copper	15½

Curb Stocks.

Stocks.	Bid.
Arizona Commercial	10½
Ahmeek	50
Cumberland Ely	5¼
Eagle	1⅛
East Butte	4

Greene Cananea Copper	5⅞
Globe Con. Copper	5
Hancock	4⅞
Keweenaw	5¼
Nevada Con.	7¾
Nipissing	6¼
Superior & Pittsburg	8⅝
Utah Apex	2⅝
B. & L.	80
Majestic	85
Shaw	39

Nevada

[Received over the private wire of O. L. Mato & Co., 221-223 Boston Building, Denver, Colorado.]

San Francisco, Cal., Dec. 12.—Following were the closing quotations on mining stocks today:

Comstock.

Stocks.	Bid.
Ophir	1.25
Mexican	35
Gould & Curry	07
Cons. Virginia	31
Savage	29
Hale & Norcross	49
Yellow Jacket	1.40
Belcher	17
Confidence	....
Sierra Nevada	34
Exchequer	20
Union	....

Tonopah.

Stocks.	Bid.
Tonopah of Nevada	6.25
Montana Tonopah	....
Tonopah Extension	1.25
MacNamara	18
Midway	49
Tonopah Belmont	99
Tonopah North Star	09
Ohio Tonopah	02
West End Cons	30
Rescue	....
Tonopah & California	02
Golden Anchor	03
Jim Butler	46
Cash Boy	01
Monarch Pittsburg Ext.	61
Montana Midway Ext.	01
Golden Crown	03

Goldfield.

Stocks.	Bid.
Sandstorm	20
Columbia Mountain	16
Jumbo Extension	54
Vernal	05
Pennsylvania	....
Kendall	11
Booth	19
Blue Bull	15
Adams	05
Silver Pick	24
Nevada Boy	02
Black Butte Extension	03
Blue Bell	06
Dixie	03
Goldfield Columbia	08
Hibernia	02
St. Ives	41
Conqueror	04
Black Rock	02
Lone Star	09
Goldfield Wonder	....
Potlatch	....
Oro	08
Kendall Extension	....
Sandstorm Extension	....
Mayne	02
Atlanta	24
Great Bend	25
Simmerone	03
Empire	....
Red Top Extension	11
Florence	3.45
Diamondfield B. B. Cons.	16
Goldfield Daisy	76
Laguna	75
Commonwealth	....
Combination Fraction	69
Great Bend Extension	05
Great Bend Annex	04
Black Butte Bonanza	01
Kewanos	23
Esmeralda	03
Portland	07
Crackerjack	06
Red Hills	25
Mohawk Extension	04
Lou Dillon	04
Yellow Tiger	09
Grandma	06
Silver Pick Extension	....
Yellow Rost	....
Columbia Mountain Ext.	....
Goldfield Cons.	3.92½
Diamondfield Triangle	....
Coming Nation	02

Manhattan.

Stocks.	Bid.
Manhattan Cons.	22
Manhattan M. Co.	01
Gold Wedge	03
Seyler Humphrey	02
Dexter	....
Little Joe	01
Crescent	....
Combination	....
Mustang	....
Cowboy	01
Original Manhattan	....
Broncho	02
Pinenut	03
Buffalo	01
Stray Dog	09
Yellow Horse	02
Indian Camp	04

Bullfrog.

Stocks.	Bid.
Original	02
Bullfrog Mining	05
Montana Bullfrog	....
National Bank	09
Lige Harris	....
Amethyst	06
Gold Bar	35
Denver Bullfrog Annex	....
Bonnie Clare	09
Mayflower Cons.	15
Montgomery-Shoshone Ext.	02
Golden Sceptre	03
Montgomery Mountain	05
Bullfrog Diamondfield	02
Homestake Cons.	67
Yankee Girl	01
Nugget	....
Tramp Cons.	18
Victor	02

Other Districts.

Stocks.	Bid.
Fairview Silver King	....
Fairview Eagle	....
Nevada Hills	3.25
Pittsburg Silver Peak	1.07½
North Star Wonder	....
Eagle's Nest	21
Nevada Hills Florence	....

Salt Lake City

Salt Lake City, Utah, Dec. 12.—Following were the closing quotations on mining stocks today:

*Stocks.	Bid.
Alice	....
Ajax	24
Butler-Liberal	04
Bullion Beck	....
Beck Tunnel	54
Black Jack	22
Colorado	2.32½
Carisa	20
Columbus Cons.	1.82½
Cons. Mercur	20
Daly Mining	....
Daly-West	....
Daly-Judge	4.05
Eagle and Blue Bell	1.15
Grand Central	2.75
Lower Mammoth	51
Little Bell	1.15
Little Chief	3.00
Mammoth	1.60
May Day	35
Mason Valley	85
New York	....
Mountain Lake	25
Ontario	2.25
Ohio Copper	2.02½
Nevada Hills	2.50
South Swansea	05
South Columbia Cons.	50
Tetro	01
Thompson	10
Uncle Sam	48
Utah Mining	1.47½
Victoria	....
Victor	04
Yankee	....
Iron Blossom	21
Sioux Cons.	16
Crown Point	12
Seven Troughs	31

*Otis & Hough.

Splendid Showing of the Denver Banks

The healthy statement of the seven national banks last week should certainly give, not only our own people, but the entire country confidence in the stability and strength of these institutions. As to be expected there was quite a falling off in deposits, but the people have recovered their confidence and deposits are now increasing every day. In thirty days the banks throughout the state will be doing a heavier business than ever, because the hoarded money that has been accumulating for the past two months will return to the banks like a flood.

It is understood the banks will resume currency payments about the first of the month. In fact, they have already resumed as far as necessary or required. The following statement was issued by the seven national banks of Denver on the 3rd inst.:

FIRST NATIONAL.

RESOURCES.

Loans and discounts		$7,089,201.89
Stocks, bonds and securities		5,430,330.63
Real estate		118,892.79
U. S. bonds for deposits and circulation, at par	$1,400,000.00	
Due from banks	4,471,060.54	
Cash on hand	2,713,317.22	
		8,584,377.76
Total		$21,222,803.07

LIABILITIES.

Capital stock	$ 1,000,000.00
Surplus	1,025,750.76
Circulation	991,300.00
Deposits	18,205,752.31
Total	$21,222,803.07

COLORADO NATIONAL.

RESOURCES.

Loans and discounts		$ 5,542,666.47
U. S. bonds to secure circulation, par value		500,000.00
Other bonds and securities		3,201,380.01
Bank building and other real estate		68,046.00
United States bonds	$ 425,000.00	
Due from banks and U. S. treasurer	2,416,845.52	
Cash on hand	3,548,360.04	
		6,390,205.56
Total		$15,702,298.04

LIABILITIES.

Capital stock		$ 500,000.00
Surplus and undivided profits		557,534.47
Circulation		498,500.00
U. S. government deposits	$ 475,241.41	
Other deposits	13,671,022.16	
Total deposits		$14,146,263.57
Total		$15,702,298.04

DENVER NATIONAL BANK.

RESOURCES.

Loans and discounts		$4,221,994.08
U. S. bonds to secure circulation		500,000.00
Other stocks and bonds		1,690,268.80
Premium on bonds		10,000.00
Furniture and fixtures		9,250.00
Due from other banks and U. S. treasur	$1,174,491.21	
U. S. bonds	350,000.00	
Cash	1,432,117.87	
		2,956,609.08
Total		$9,388,121.96

LIABILITIES.

Capital stock	$ 500,000.00
Surplus fund	600,000.00
Undivided profits (net)	45,600.69
Circulation	500,000.00
Deposits	7,742,521.27
Total	$9,388,121.96

NATIONAL BANK OF COMMERCE.

RESOURCES.

Loans and discounts		$1,545,606.47
Overdrafts		6,541.26
U. S. bonds		500,000.00
Premiums paid		13,575.00
Other stocks and bonds		630,050.78
Furniture and fixtures		8,828.22
U. S. bonds to secure deposits	$ 50,000.00	
Due from U. S. treasurer	25,000.00	
Due from banks	306,394.92	
Cash	433,856.50	
		815,251.42
Total		$3,519,853.15

LIABILITIES.

Capital Stock	$ 500,000.00
Surplus fund	250,000.00
Undivided profits	102,542.22
Dividends unpaid	48.00
National bank notes outstanding	500,000.00
Deposits	2,167,262.93
Total	$3,519,853.15

CENTRAL NATIONAL BANK.

RESOURCES.

Loans and discounts	$ 661,083.05
Overdrafts	7,442.14
U. S. bonds and premiums	52,437.50
U. S. treasurer 5 per cent fund	2,500.00
Bonds and securities	77,000.00
Due from banks	174,660.47
Cash in vault	339,916.02
Total	$1,315,039.18

LIABILITIES.

Capital	$ 200,000.00
Undivided profits	11,987.38
Circulation	50,000.00
Deposits	1,018,051.80
Cashiers' checks (special)	35,000.00
Total	$1,315,039.18

CAPITOL NATIONAL BANK.

ASSETS.

Loans and discounts		$1,197,682.51
Stocks, securities, etc.		200,788.02
Due from U. S. treasurer		3,332.50
United States bonds	$101,937.50	
Due from banks	409,056.50	
Cash	479,142.61	
		990,136.61
Total		$2,391,939.64

LIABILITIES.

Capital stock	$ 300,000.00
Surplus and profits	139,671.34
Circulation	74,990.00
Deposits	1,877,278.30
Total	$2,391,939.64

UNITED STATES NATIONAL BANK.

RESOURCES.

Loans and discounts		$1,240,644.88
Overdrafts		843.74
Furniture and fixtures		14,000.00
U. S. bonds to secure circulation and premium on same		207,500.00
Other high grade bonds		124,033.04
United States bonds (par)	$ 50,000.00	
Due from banks	648,455.80	
Cash in vault	502,461.51	
		1,200,917.31
Total		$2,787,938.97

LIABILITIES.

Capital	$ 200,000.00
Surplus and undivided profits	87,661.53
Circulation	199,995.00
Deposits	2,300,282.44
Total	$2,787,938.97

Deposits at the Close of Business Night Before Last, as Compared with Aug. 22.

First National	$11,268,894.10	$ 7,584,377.76	$22,113,674.62	$18,905,762.31
Colorado National	6,474,834.12	6,390,205.56	14,655,702.50	14,146,263.57
Denver National	3,794,893.84	2,956,609.08	9,227,786.33	7,742,521.27
United States National	1,062,316.76	1,200,917.31	2,332,817.34	2,300,282.44
Nat'n'l Bank of Com.	1,253,110.92	815,251.42	2,631,116.15	2,167,262.93
Capitol National	616,431.88	888,199.11	1,877,294.54	1,877,278.30
Central National	636,920.20	514,576.49	1,182,121.58	1,053,051.80
Total	$25,107,410.82	$20,350,136.73	$54,020,513.06	$47,492,412.62

CORPORATION AFFAIRS AND FINANCES.

UNITED STATES TREASURY.

Fiscal year 1907-8:

	Dec. 9	This month.
Receipts	$2,311,680	$13,877,074
Expenditures	2,630,000	16,950,000
Deficit	$ 318,320	$ 3,072,926

Fiscal year 1906-7:

Receipts	$1,935,586	$14,679,682
Expenditures	1,240,000	10,090,000
Surplus	$ 695,586	$ 4,589,682

	Dec. 9, '07	Nov. 9, '07
Available cash balance	$251,014,030	$240,399,475
Of which in Banks	240,340,976	226,069,031

National bank notes received for current redemption: This day, $475,903; this month, $2,151,087; fiscal year, $98,101,375; national bank notes awaiting redemption, $8,192,590; 5 per cent. redemption fund, $25,747,671.

NEW YORK SUB-TREASURY.

	Paid to Banks.	Received From banks.
December 7	$1,829,000	$3,357,000
Since Friday	5,907,000	7,370,000

The sub-treasury was creditor at the clearing house on Monday $623,971. There were no extraordinary items. The banks have lost to the subtreasury since Friday $1,463,000, and for the same period the sub-treasury was creditor at the clearing house $635,282.

DOMESTIC EXCHANGE.

Dec. 10.—All quotations are in cents per $1,000 premium or discount:

Boston—Money at the clearly house 7.3 per cent. New York funds were offered at 15 cents discount for cash, and no bids.

Chicago—New York exchange par unchanged.

New Orleans—New York exchange steady; commercial $1 discount, unchanged; bank par to $1 premium, unchanged. Money firm, call 7 to 8 per cent.

St. Paul—New York exchange $1 premium, off 40 cents.

IRON AND STEEL PRICES.

Prices of the leading iron and steel articles Dec. 6th, as compared with the corresponding period of last year, follow:

	Dec. 6, 1907.	Dec. 7, 1906.
Foundry No. 2, Cincinnati	$18.00	$25.00
Bessemer, Pittsburg	19.25	23.35
Bessemer billets, Pittsburg	28.00	29.50
Forging billets, Pittsburg	30.00	36.50
Open-hearth, billets, Phil.	30.00	33.00
Wire rods, Pittsburg	34.00	37.00
Steel rods, East	28.00	28.00
Steel bars, Pittsburg	1.60	1.80
Tank plates, Pittsburg	1.70	1.70
Beams, Pittsburg	1.70	1.70
Angles, Pittsburg	1.70	1.70
Sheets, Pittsburg	2.50	2.50
Wire nails, Pittsburg	2.05	2.00
Cut nails, etc.	2.00	2.05
Barb wire, Pittsburg	2.50	2.45
Tin plate, New York	4.09	4.09

JAN 20 1908

★ SCIENTIFIC AMERICAN ★

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MINES AND MINING

FOURTEENTH YEAR WEEKLY ESTABLISHED 1893

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Scientific American Ex
361 Broadway

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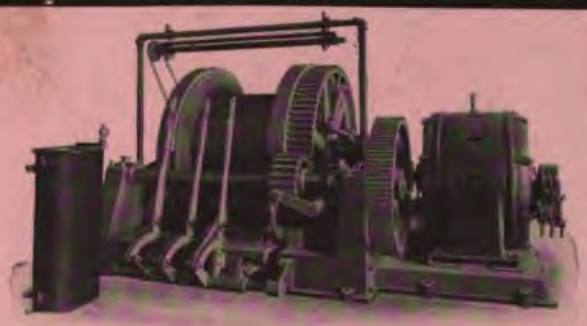

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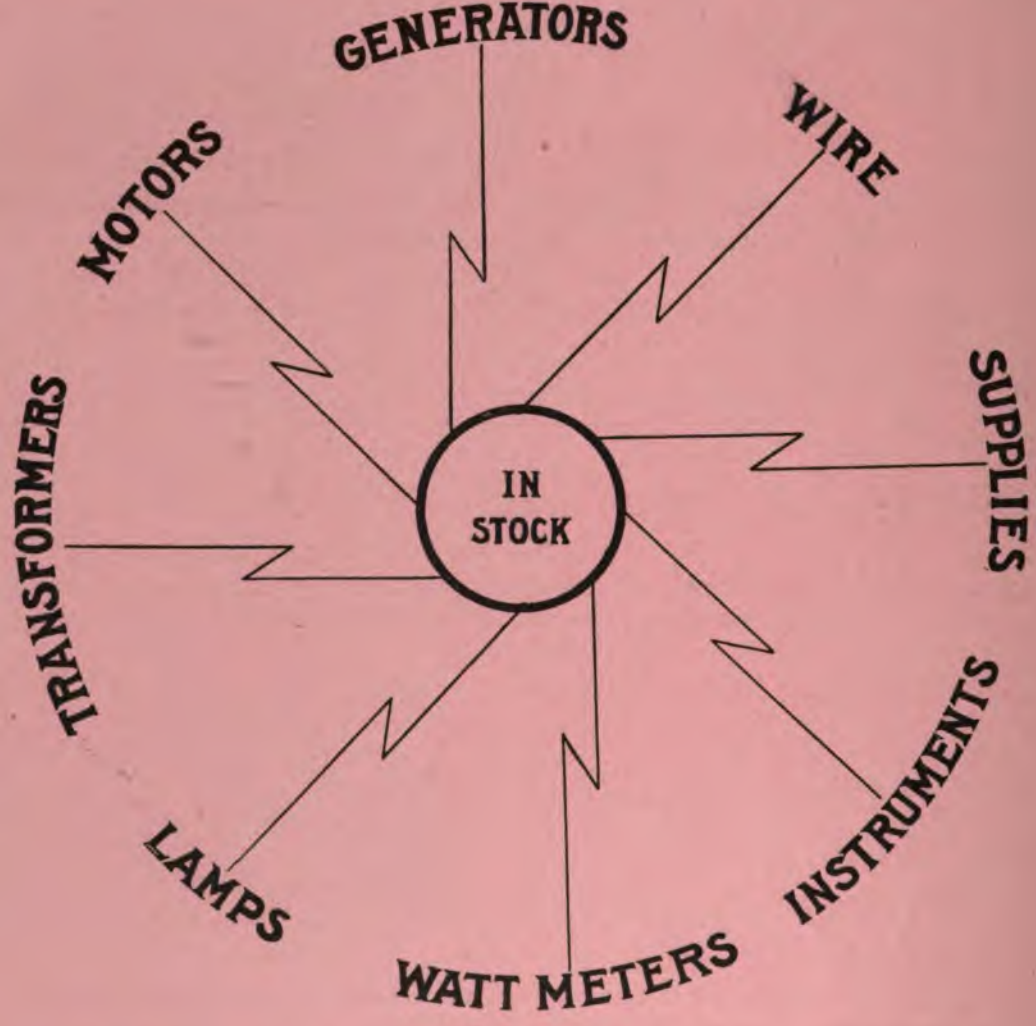

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MINES AND MINING

WEEKLY

Vol. XV Denver, Colorado, December 20, 1907 No. 12

MINES AND MINING

A. J. CASEY.....Manager
C. L. HALL.....Editor

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We will be pleased to publish any correspondence relating to mining, milling, metallurgy and kindred subjects, or sharp, clear photographic sketches pertaining to improved machinery, new inventions, mines, mills, smelters, or of any other branch of the mining industry. As a matter of protection and good faith, name and address must accompany such communication.

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The Goldfield Situation

The situation at Goldfield has shown no new phases, according to late reports. The Mine Owners' Association and the Western Federation of Miners are both apparently awaiting the findings of the government commissioners. The commission is composed of Charles P. Neill, labor commissioner, Herbert Knox Smith, commissioner of corporations, and Lawrence O. Murray, assistant secretary of the Department of Commerce and Labor.

The commission has authority to investigate every phase of the conditions existing at Goldfield, and are hearing the testimony on both sides. This will consume at least ten days' time, and very few developments are expected before then.

The Western Federation continues to patrol the mines, and the mine owners are bringing in a small number of new men each day. At present there are about 200 miners at work in the mines. Each organization is threatening to file criminal proceedings against the other. No serious outbreak is likely, owing to the presence of the government troops, which will not be withdrawn very soon, from present indications.

The Western Federation accepts the installation of the troops with bad grace, although it is for their safety and welfare as well as for the protection of the employers.

Prompt action in such cases is to be commended, and although in the end it may develop that some other course of action might have been followed, yet the presence of the commission and the troops will prevent trouble.

The peace offer of the Western Federation will not be accepted without serious deliberation; however, the mine owners are anxious for a settlement of the trouble, and will come half way.

Leadville Situation

With silver only two points and a fraction above the half-dollar mark and with lead and spelter correspondingly low, many of the Colorado mines are being forced to either close or reduce their force. This week orders were received at the properties of the Western Mining Company, the Guggenheim corporation, to cease operations, and many of the neighboring mines are following suit. Over 600 men were laid off in Leadville and about 500 in Creede and Silverton.

The situation, following upon the closing of the Montana mines, while unpleasant, is not likely to continue long, as the mine owners of the state predict an early reaction in the state of affairs, and sufficient rise in prices to net them a profit on their low-grade ores.

Assessment Measure Defeated

The bill introduced by Senator Teller to relieve claim owners from the necessity of doing their annual assessment work for 1907 was juggled by the members of Congress until too late to pass it at last Wednesday's session, and as there remains but one more sitting of Congress this year, which will be devoted to routine business, it is not likely that the bill will be passed. At this late date little benefit would be received from the adoption of the bill, and its rejection will work very little hardship on mining men, most of whom did not count upon its passage.

The Washoe Smelter Closed

An event which has been anticipated for some time occurred when the Washoe smelter closed last Saturday. This plant, which is the largest copper smelter in the world, is owned by the Washoe company and operated under lease by the Anaconda Mining Company, to whom the closing means an immense loss. The present condition was forced upon them, however, by the copper situation, and, during the last two months, the works have been run at a great financial loss. The closing of this plant will throw out of employment some 3,000 men, and paralyze the business in Anaconda.

The policy of the company is liberal in the extreme, and it will continue the salaries of the heads of departments during the shut-down. Many of the employes have received pay for the full month of December, and the married men among the smelter laborers will be allowed credit

at the company's stores in Anaconda until work is resumed.

The Anaconda Mining Company, owing to its contract with the Helena Power and Transmission Company for power, and its coal agreements, will suffer heavily, prohibiting the possibilities of any dividends for some time to come. The duration of the shut-down is a matter of conjecture, even among the officials themselves, and will depend upon the conditions governing the price of copper. The Great Falls smelter, belonging to the same company, is running at about one-half its normal capacity and may be further reduced. In view of the policy being carried out by the Calumet and Hecla company of Michigan, the outlook for an early re-opening of the smelter is unfavorable.

Montana will not soon recover from the closing of her mines and smelters and the conditions are to be regretted. Within the last few months over 15,000 men have been thrown out of employment in the Butte and Anaconda district alone, most of whom are leaving the state.

Lord Kelvin Dead

The death of Lord Kelvin, better known as Sir William Thomson, is a great loss to the scientific world and will be learned with deep regret. He was acknowledged by all to be the greatest physicist and scientist of his time, and has been called the "Father of Electrical Engineering."

He came of scientific antecedents, his father being professor of mathematics in the University of Glasgow, where Sir William afterward filled the chair of Natural Philosophy.

His investigations were made with no desire for any other reward than the pure enjoyment in the doing. His desire to give all his inventions to the public without patent is an instance of his singleness of purpose in the advancement of science.

Sir William Thomson's contributions to the scientific world include his numerous physical papers and his work on the Atlantic cable. In abstract science, his mathematical investigations in heat, mechanics, electricity and magnetism have become classical, and his inventions, an outcome of his applied science, are used in every branch of electrical engineering. His clear reasoning and practical faculties were shown in his prediction of the failure of the first Atlantic cable, and his consequent solutions of the difficult problems when called upon to lay a successful line of communication between the two continents.

He was a man of broad-mindedness, modesty and simplicity, and advanced theories far in advance of his time. At his majority he advocated theories which the world would not accept until almost a score of years afterwards. The reverence and respect which the scientific world held for him was shown by the many Degrees and Fellowships conferred upon him, and the honor of Knighthood.

Men of Kelvin's caliber are rare, and his death entails a loss, the greatness of which is hardly realized.

Coal Mine Disasters

With alarming frequency these disasters are accumulating. They appear to be coming along in the United States alone at the rate of ten or a dozen a year. There is grave responsibility somewhere. Either the miners themselves, or the mine operators, must have a sort of growing indifference to the loss of life and the destruction of property. There must be gross carelessness or neglect on the part of the workmen, the management, or some one.

The horrible calamity that occurred a few days ago in the Consolidated Coal company's mines at Monogah, near Fairmont, West Virginia, whereby 350 lives were snuffed out in a living tomb, without an opportunity to breathe a hasty prayer to God to save them from the consuming flames, is a disaster scarcely paralleled in the annals of coal mining. The bodies already recovered from the awful holocaust number 350, and still others are being brought up out of this subterranean hell, a mangled mass of undistinguishable humanity.

Officers of the company state that there are bodies in the ruins that in all probability will never be recovered. These are lying under a fall of slate and it may be months before that part of the mine is opened. The census of Monogah and vicinity, begun by the Fairmont Coal Company, will show that more than 300 women are made widows, and more than 1,000 children left fatherless as a result of the terrible mine disaster of Friday. The census was commenced by the company to ascertain, if possible, just how many men were in the mines at the time of the explosion, how many families were affected and their financial condition.

Only a few days before, an explosion took place in the Naoma mine of the United Coal Company at Fayette City, Va., by which thirty-four miners were killed, and the coroner's jury has just rendered the following verdict: "We find that the men came to their deaths as a result of an explosion of gas and dust in the Naomi mine of the United Coal Company. The gas seems to have accumulated from insufficient ventilation, and was, we believe, ignited from sparks of the electrical wires or an open light, at some point not definitely located.

"We condemn the use of electric wires on return air currents, and we further condemn the use of open lights in all gaseous mines.

"We would recommend that hereafter an air shaft be opened up where the workings reach a point 4,000 feet from the main opening. Further, that the mining commission appointed by the state governor recommend such amendments to the mining laws that human life will be better protected and that the present laws be more rigidly enforced."

The number of men entombed in this mine was forty-seven, of whom five were Americans. Owing to the poisonous gas fumes the rescuers were unable to remain in the entries more than fifteen minutes at a time. Fayette City is thirty-five miles from Pittsburg and about two miles from Monongahela City. They all succumbed to the deadly after-damp.

The authorities of Pennsylvania will immediately take steps to enforce more rigid rules for the safety and preservation of human life in the great coal districts of that state.

More lives have been snuffed out in the coal mines of this country during the last twenty years than in all Europe for a century. Over 11,000 men have lost their lives in the Pennsylvania coal mines in the last forty years.

Colorado is comparatively young in the production of coal, but in the last fifteen years 387 lives have been lost in her coal mines. In their haste to make money, operators are too reckless of human life. More safeguards should be thrown around the lives of those who delve in the dusky and dangerous mines.

During the last forty years it is estimated that over 25,000 lives have been lost in the collieries of the United States, or at the average rate of more than 600 a year. For the last four or five years the annual death roll has been nearly 1,000, and this year it will exceed 1,500.

Here this week comes the news of another horrible coal mine explosion, in No. 1 of the Yolande Coal & Coke Company's mine, in the eastern part of Tuskaloosa county, Alabama, thirty-five miles south of Birmingham, in which fifty or sixty miners are reported killed. It was what is termed a gas and dust explosion, the result of carelessness on the part of miners or operators.

The greatest disaster we call to mind occurred in the Courrieres col-

liery of France, March, 1906, where about 1,100 people were smothered and burned to death. By investigation it has been shown that a large majority of these calamities were the result of inexperience, carelessness on the part of employes, or neglect of the operators to provide reasonable safeguards.

In speaking of the Monogah disaster the New York Herald declares that in spite of the state system of inspection, the precaution taken by the operators to protect their property, and the miners to safeguard their lives, the increasing size of the annual death roll indicates a reckless disregard for human life that is a reproach to the nation.

To what extent the tendency to employ inexperienced men is responsible for the frequency of accidents is difficult to ascertain accurately. It is notorious that in Pennsylvania, which produces fully one-third of the coal mined in the United States, the operators bitterly opposed a scheme of the unions the state regulation requiring them to work only miners qualified by experience. In reality it was only a proper measure of safety. The obvious need in the mines is for more rigorous restrictions. Even if the existing laws are enforced they are plainly inadequate.

Just as we go to press come dispatches telling of another great coal mine explosion, near Connellsville, Pennsylvania, in the Darr mine, that killed about 200 miners. The dispatch states that 200 men are reported killed by a terrific explosion in the Darr mine of the Pittsburg Coal Company, located on the Youghiogheny river, about eighteen miles from Connellsville.

The explosion occurred at 11:30, tearing away the mouth of the shaft and destroying the shaft house and machinery. An immense volume of smoke issued from the shaft, indicating that a fire was raging below. Of the 200 miners in the workings at the time of the explosion, 100 are Americans, the rest being mostly Hungarians. None, it is believed, can escape.

Up to 1 o'clock it has been impossible to do anything effective in the line of controlling the flames or rescuing the imprisoned men. Local mining men say there is little hope of any of the entombed men being taken out alive.

High-Graders in Australia

The Pall Mall Gazette states that there have recently been unpleasant revelations as to the extent to which the stealing of gold is carried on by the miners in Australia.

Some authorities estimate that as much as £1,000,000 worth of gold is lost every year by the Australian mining companies in this way. Most of the mining centers are haunted by a shady class of nominal "gold buyers" who are really the accomplices of the dishonest miners, the "fences" in criminal slang. Representatives of the mining companies in Bendigo, where a record number of cases of gold stealing have recently occurred, have met in conference to consider the best means of dealing with the evil.

As one way of checking the evil it was decided to establish a register of all the miners employed in the Bendigo district, so that the movements and migrations of dismissed or reasonably suspected men might be traced and observed. In this way it is hoped to prevent the thieves getting employment in other mines.

Railways of the World

W. C. Telchman, consul at Eihenstock, Germany, in quoting statistics recently published in that country, declares that the figures develop the remarkable fact that the milage of railroads in the United States alone exceeds that of any other country and of all Europe.

He says the total length of the railways of the world on January 1, 1906, was 563,771.7 miles (English) or, in the figures given, 905,695 kilometers, of which the United States represents 215,713.39 miles (351,503 kilometers) and Europe 192,247.52 miles (309,393 kilometers), resulting in an American lead of about 23,500 miles over Europe. The total mileage on the American continent is estimated to be more than one-half of that of the entire world.

Railway construction during 1905 added 12,524.33 miles (20,156 kilometers) to the world's total mileage, and Germany shows comparatively the largest increase—six times in excess of Great Britain. Considerable progress is now being achieved in the building of additional railways connecting the German-African cotton and mining districts in the interior of Africa with the sea coast.

The report calculates that the entire capital invested in the construction of the world's railroads amounted on January 1, 1906, to 182,000,000,000 marks or $43,310,000,000.

The world is adding to its railroad mileage at the rate of 10,000 to 15,000 miles a year. Great progress will be made in railway construction on the North American continent during the next two decades, including the United States, British North America, Alaska and Mexico. In the mean time our island possessions will have to be equipped with more railroads—Hawaii, the Philippines, Cuba, Porto Rico and others. With such vast territory to develop there is no danger of the United States extending her railroad mileage too speedily. This great and rapidly growing West, Alaska and other geographical divisions of the United States need thousands of additional miles of railroads.

Nevada and Canada Barred Out

If the American Smelting and Refining Company is unable to handle all the ore offered it, why should it object to the miners building and operating their own smelters? The miners are as well able to build and operate their own smelters as the American Smelting and Refining Company. It is understood this great company has refused to receive at present ore from Canada, Nevada and other parts of the country. Late in November it was reported that the inability of the so-called smelter trust to handle all the ore offered had forced the company to shut off a large amount of shipments from Nevada and other parts of the north and northwest. A few days ago 12,000 tons of bullion worth over $4,000,000, was reported on the way to the smelters of Denver, Salt Lake and Omaha, but for the time being it will exclude outside ores.

The smelter company announces that it will receive all ores shipped from the Colorado camps, but the smelter trust has increased the cost of treating Nevada ores ten per cent., which makes the second increase within a few days. It has deferred payments for the same from forty-five to sixty days.

"This action was necessary on account of our inability to turn bullion into money fast enough," said an officer of the company this morning. "It takes forty-five to sixty days to realize on bullion. It will simply defer payments until this is done. Formerly we made payments as soon as we got returns from the assayers."

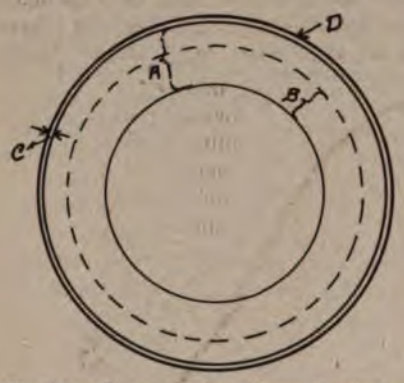
Of course it will greatly inconvenience mine operators, as it will curtail production and throw thousands of good miners out of employment at the very season of the year when they need work the most.

A list of the principal concentrating tables now in use in milling would include the Card, Derster, Wilfley, Overstrom, Pinder, New Standard, and New Woodbury. Several new tables have been placed upon the market lately.

Blast Furnace Lining

By ALVIN R. KENNER

The construction of a blast furnace is an expensive and important operation as it requires the drawings of extensive plans and an outlay of some $800,000. To the casual visitor at the plant of a steel and iron company, who has little knowledge of the reactions going on in a furnace or of the means necessary to produce them, such a structure consuming carload after carload of raw materials and giving back fluid metal, seems wonderful and a trifle awe-inspiring. However, to the builder, who understands each detail of the construction it loses its bigness and mystery. The parts that are most readily visible to the eye, the iron shell of the stack, the bronze cooling plates on the bosh and the



Outline of Horizontal Cross-Section of Blast Furnace.

steel packet of the hearth below, are but the covering to the materials that must withstand the heat and changes caused by the charge. While the outside would suggest a large interior diameter, the thick heavy lining necessary takes up from eight to nine feet of the space. Such a thickness is required because the action of the charge is continually cutting away the lining, and as a new lining means the closing down of the furnace, it is economy to make it as heavy as a normal capacity will allow.

The reactions in a blast furnace are comparatively simple. A charge consists of coke, limestone and iron ore. The air or oxygen forced through the tuyeres, just above the hearth, burns the coke which is carbon to a carbon dioxide, which passes up through the incandescent coke above and is reduced to carbon monoxide. This monoxide takes the oxygen from the iron ore producing metallic iron. The limestone flux unites with the gangue of the ore forming a fusible slag, which settles with the metallic iron to the bottom of the furnace, but remains above the molten metal because of its lesser specific gravity. The two are then tapped off at their respective levels.

Although the proportions of a charge are calculated so that there will be as little eating of the lining as possible, yet it cannot be completely avoided, and for this reason heavy lining becomes necessary. The typical lining of a blast furnace, size 20x95 feet, in one of the largest plants of the U. S., is as follows: The base is a circular block of cut stone of about twenty feet, eight inches in diameter, which practically rests on bed rock at a depth of fifteen feet in the ground. Upon this are put four layers of concrete of diminishing diameter, the diameter of the top one being fourteen feet, three inches and the thickness of each eighteen inches. Around this concrete and even with the edge of the cut stone are placed refractory fire brick. The width of this brick work increases as the concrete decreases until it measures four and one-half feet on each side of the hearth. This thickness is maintained for about five feet, above which the lining measures two feet, three inches, which is the average for the bosh and as far up as the stack, a distance of over twenty feet. From here up, which constitutes the stack, the lining is composed of two grades of brick. The space A shown in diagram varies from four feet, six inches at the crucible line or top of the bosh to four feet, three inches at the top and is composed of Anglo-Saxon and Benezeti brick. The Anglo-Saxon brick are thirteen and one-half by four and one-half by two inches in size and set in front while the Benezeti brick, size eight by four by two and one-half inches are placed back of them. Every fifteen inches, abrasive plates are placed between the layers of brick. These plates are shaped to fit the curvature of the furnace and are six feet in length, two feet, six inches wide, and four inches thick. By inserting these, the bricks are held in place longer, after the eating action begins. Where a very high refractory brick is required the "Kentucky Steel" brick made in Portsmouth, Ohio, is used. The space C (shown in diagram) is filled with some material which will allow for expansion and contraction of the shell as its temperature varies. Usually this substance is a granulated cinder, made by running a stream of water through hot furnace slag. The expansion space C is six inches wide, and runs from the supporting columns to the top of the stack. The outside shell D, is made of iron plate, double rivited, and three-eighths inches in thickness. The mortar used in holding the brick together is usually of same material as the bricks themselves, so that the entire face has an equal resisting power.

View of a Modern Blast Furnace.

prove my deductions. It was the case of vein intersections, and with thirty days more work we should have encountered a good sized ore body, as $300,000.00 had been taken out of another intersection on the same claim. I couldn't persuade the company to continue and consequently I left with a half month's extra pay. I arrived in Los Angeles two days later, and on the fourth day was offered a position at Newton, Calif. This was about the last of October, five months after school closed.

The Newton mine was a tunnel proposition, and I had about nine men working. I made a hit there from the very first by locating, within a few feet, a vein in hunting for they had spent over $1,400.00. Some surveyor had figured out where he though it should have been but the dip was not uniform and he had placed it too far toward the North. I suspected that the vein had become more vertical after the first hundred feet and although the hillside was covered deep with slide rock, I found an out crop about a hundred feet above the tunnel mouth and four hundred feet below the level of the mouth of the 50 foot shaft. This was after several days digging, but the rest was easy for I saw at once how they had missed the ledge. I am enclosing a rough outline showing the mouth of the tunnel and the position of the vein. The dotted line shows where the surveyor had figured it would be, and the solid line its real position. In starting the tunel, it was placed a little to the South, in order to prevent what actually happened, that is; going too far to the North. Consequently when they started to cross cut from the tunnel they were prefectly sure the vein was not behind them—but it was.

Although three shifts were working on the tunnel, I didn't have as much to do as on the Planet mine in Arizona. The geology at Newton did not require so much study as at the former place, and then the men were all steady honest workers. Most of them were married, work was none too plentiful, and they were almost an ideal bunch. I believe married men as a rule will do a better day's work than the single man, not so much because he can't afford to migrate, but because he has settled down, and cuts out the booze with its correspondingly late hours.

The grub and climate in California were fine, and a direct contrast to the cactus, sand and heat in Arizona. I liked the place, but left for this San Juan position last May, because there is more money and a better future in it. It was offered to me as a result of my former employer relating the story of how I found that vein, although he didn't do it for that purpose. I intended to bring this letter up to date and tell you some experiences I have had here, but it is too long already, and your patience must be exhausted. I will reserve the rest for my next letter, but don't put off answering for dread of it. I will expect a long epistle from you describing the wonders of the Cerro de Pasco district, so don't disappoint me.

Yours, as ever,

Bob.

Electrical Shock Treatment*

The use of electricity in mines, and the conduction of current along gangways and entries through exposed wires, has resulted in numerous accidents due to miners coming in contact with two conductors at different potentials. The electric shock that results depends mainly on the strength of current passing through the body, the time for which it is maintained, and the physical condition and peculiarities of the victim. There is a difference of opinion as to whether alternating-current or continuous-current shocks under certain conditions are the more dangerous. It is well to remember, however, that a high-potential alternating circuit should not be regarded as safe to handle, even when the current has been shifted off, until it has been connected to earth and so practically discharged.

A live wire may often be handled without inconvenience when standing on an india-rubber mat or on a dry-wood floor, but it is a safe rule to avoid contact with any part of an electrical apparatus without thoroughly understanding what one is doing. The symptoms of an electric shock are as follows: (1) Stoppage or weakening of the action of the nerves; (2) contraction and stiffening of the muscles; (3) stoppage or weakening of the action of the heart. The contraction of the muscles is what prevents the victim from letting go after grasping a live wire.

A person who has received a severe shock may become unconscious and seemingly cease to breathe. None of these symptoms necessarily indicates death, and under no circustances should remedial measures be abandoned until a physician has pronounced life extinct. It is most likely that many victims have been given up for dead after an electric shock, when the continuous application of further remedies might have restored them. A number of cases are on record where subjects who have received severe shocks have been unconscious for more than 30 minutes without the slightest discernible heart action, and still have recovered because of the artificial respiration applied.

In treating a victim, it is advisable to elevate the body and legs so as to send the blood to the brain, which action may prove a remedy for syncope, a condition often resulting from such a shock. If the heart has stopped beating, it is sometimes possible to start that organ again by applying a series of smart taps over the chest. The treatment should also be accompanied by drawing the arms in and out so as to aid or rather force artificial respiration. A number of authorities also advocated hypodermic injections of ether and alcohol beneath the skin, so as to distend the arteries and help the heart action. In trying to disengage a man who is in contact with live metals, it is well to remember that dry clothing is a good insulator, and the best plan is to seize the victim's arm on the clothing and try to pull him away. Under no circumstances should the rescuer touch the bare skin or take hold under the armpits where the clothing is apt to be damp.—

*Mexican Mining Journal.

GOLD IMPORTS.

Heidelbach, Ickelheimer & Co., have engaged $500,000 gold for import This makes a total of $15,575,000 by this firm, and $100,000,000 engaged on this movement.

The Cunard liner Lusitania, carrying $3,200,000 gold, consigned to New York bankers, is not expected to reach here until Sunday morning. At the last report she was 1,180 miles east of Sandy Hook. The local agents attribute the delay to bad weather, as the Slavonia has not been heard from.

An Associated Press dispatch from Paris says the Bank of France, expressing the desire of France further to assist the United States financially, will continue to remit gold to the United States by discounting American commercial paper, or else by sending gold to England through the purchase of time sterling bills. This aid will be rendered so long as needed, with the understanding that the Bank of France will meet first the gold requirements of French banking institutions.

The ultimate depth to which mining will be conducted on the Witwatersrand fields is dependent on the grade of ore and the working costs. At present mining engineers are considering the possibility of mining at depths from 6,000 to 12,000 feet.

Percentage of output treated.
Products of Treatment—
Weights, values, disposal.
Placer—
Sluicing, hydraulicking.
Dredging.
Coal—
Screening—
Revolving, shaking.
Number of sizes made.
Washing.
Coking.
Percentage of output treated.
Products of Treatment—
Quality, disposal.
Developments—
Discoveries, boreholes, cuts, pits, sluices, ditches, adits, shafts, inclines, drifts, levels, entries, air courses, winzes, raises, crosscuts, sumps, rooms.
Depths, lengths, widths.
Areas, other dimensions.
Labor—
Number of Laborers—
Skilled, common.
Wages of each class.
Nationalities.
Number of animals.
Freights—
Supplies, shipments.
Cost of Supplies—
Hardware, tools, machinery.
Provisions, groceries, meats.
Fuel, electricity, water.
Timber, lumber.
Powder, dynamite, oil, candles.
Miscellaneous.
Superintendence—
Number of superintendents, foremen, shift bosses, pit bosses.
Number of office employes.
Systems of Mining—
System in Ore Mine—
Stoping, underhand, overhead.
Filling, caving.
Timbering—
Square-set, stull.
Amount required.
System in Coal Mine—
Room and pillar.
Longwall.
Panel.
Advancing, retreating.
Timbering—
Method of framing.
Amount required.
Haulage—
Tramming.
Animal.
Mechanical—
Cable, chain.
Locomotive—
Steam, compressed air, electric.
Hoisting—
Windlass, whip, whim.
Power Hoister—
First or second motion.
Steam, compressed air, gas, gasoline, electric.
Buckets, skips, cages.
Speed of hoisting.
Size and kind of cable.
Amount of material per hoist.
Pumping—
Amount of water handled per day.
Capacities and makes of pumps.
Steam, electric, gasoline, compressed air.
Sufficiency of equipment.
Ventilation—
Natural, furnace.
Fan—
Force, suction.
Nature and amounts of gases.
Cubic feet of air moved.
Lighting—
Haulage ways.
Working faces.
Drilling—
Hand—
Single, double.
Power—
Compressed air, steam, electric, Gasoline.
Coal Cutting—
Hand picking.
Machine—
Undercutting, shearing.
Compressed air, electric.
Explosives—
Black powder.
Dynamite.
Fuse, caps.

V.—Surface Plant.

Buildings—
Offices—
Business, assay.
Power house.
Hoist house.
Ore house or bins.
Tipple.
Scale house.
Shops—
Blacksmith, carpenter, machine.
Dry or change house.
Store house.
Powder house.
Stables.
Mills.
Roaster house.
Tanks.
Dredge boats.
Store.
Dwelling houses.
Boarding house.
Power Units and Machines—
Boilers, heaters, feed pumps.
Water wheels, turbines.
Compressors, fans, blowers.
Engines, hoisters, steam turbines.
Electric generators, motors.
Elevators, conveyors.
Tramways—
Aerial, surface.
Locomotives.
Timber Yard Equipment—
Saws, framers.

VI.—Illustration.

Maps of Region—
Geographical and topographical.
Geological.
Maps of Property—
Underground workings.
Surface improvements.
Sections—
Cross, longitudinal, columnar.
Photographs—
Sketches.

VII.—Valuation.

Amount and Quality of—
"Positive" ore or coal.
"Probable" ore or coal.
Value in Place—
Cost of Mining per Ton—
Development.
Drilling, breaking, timbering.
Hauling, hoisting, conveying.
Pumping, lighting, ventilating.
Placer operations.
Cost of Treatment per Ton—
Local, shipped products.
Inventory of Surface Plant—
Buildings, machinery, miscellaneous.
Inventory of Underground Equipment—
Machinery, trackage, timbering, wiring, piping, miscellaneous.
Annual Income—
Any year, average.
From sale of mine products.
Other sources.
Gross.
Net.
Local Considerations—
Labor conditions.
Climatic, hygienic.
Other points of merit or objection.

VIII.—Recommendation.

Purchase or Sale—
Bond, option, outright, reject.
Equipment, Retain or Alter—
Mining machinery.
Milling or reduction machinery.
Transportation facilities.
Buildings, power plant.
Management—
Methods of Operation—
Mining, metallurgical, transportation.
Exploitation—
Funds—

The production of gold in New South Wales, Australia, has been slightly over $5,000,000 for each of the last ten years. There were exceptions to this statement in 1899, and 1901-2, but the average production per year for the ten years period would be about 5½ millions.

The presence of a scale one-sixteenth of an inch thick on the tube of a boiler causes a loss of thirteen per cent. of the fuel heat. An old effective "anti-incrustator" is common washing soda. Glycerine, one pound to 400 gallons of water is also beneficial. However, care should be exercised to guard against excess of either as it produces "foaming."

of both the Superior & Pittsburg and the Calumet & Arizona companies.

The most important event of the week regarding the Superior & Pittsburg is the temporary closing down of the Briggs shaft. The drifting on the 1,100 level has been done in leached mineralized ground carrying more or less copper values, giving every encouragement for ore, but indications are that a greater depth must be attained before the large ore bodies will be encountered. It is for this reason that work has been stopped at this shaft, and are run on the 1,200 level. It is for this reason also that all work underground has been discontinued, as it will be much cheaper to sink after the water has been drained than under present conditions. The drift from the Junction has cut a considerable flow of water which has reduced the amount of water in the Briggs. It is the opinion of mining men who have visited the property that it will be sufficiently drained in ninety days to sink another lift. This will enable them to sink to the 1200 level more rapidly. Many prominent mining men have visited the Briggs property recently and without exception have pronounced that it has the best showing of any shaft in the district and will no doubt prove a great producer with greater depth. The new pumping plant at the Junction is about completed, and a sufficient number of boilers have been installed to take care of it, and hereafter the delays which heretofore occurred when a large flow of water has been encountered, will be handled to great advantage. Sinking and drifting will then also be more easily accomplished. The ore being shipped from the Junction now averages 11 per cent. The 1,300 foot station is being cut at present. One of the drifts on the 1200 level has cut an oxide body carrying considerable native copper, but the development has not progressed enough to determine extent of body. The Hoatson shaft is being sunk from the 1,200 level, good progress being made. No increase of water has been found. The Junction is shipping 100 tons per day, the Hoatson, 100, and the Cole 350, making a total of 550 tons daily.

On the Shattuck-Arizona development work is being carried out on the 700 and 800 levels at present, thirty men being employed. It has been found that the recent fire caused a damage of $1500, which is being repaired as fast as possible. No ore is being shipped. The directors are expected to arrive in Bisbee during the coming week, when matters of importance will be settled, the most important being the erection of a smelter.

On the Denn-Arizona a diamond drill was installed on the 1,100 foot level this week. No work except pumping is being done, sixteen men being all the labor now employed.

The Lone Star shaft of the Warren Realty & Development Company has reached a depth of 427 feet, 406 of which is being timbered. The formation consists of loose limestone containing some iron stains. This formation compares favorably with that passed through by some of the best shippers of the district when they were at the same depth. Only a day shift is being employed.

Many holders of stock in the Anderson-Apache company are refusing to pay the recent call of 50 cents per share. The reason given is of the connection of Harry Duey and James Gibbs, formerly members of the brokerage firm of Duey & Overlock, the largest in Bisbee, which failed several months ago. Both Duey and Gibbs are under indictment for embezzlement and are awaiting trial. Both are officers in the company and refuse to resign as such. The last day on which the assessment was to be paid was on Tuesday, December 10. The outcome is watched with interest.

A. S. Cox, secretary of the Sonora Bonanza Mining Company of Imuris, Sonora, Mexico, was in Bisbee this week. In an interview by a representative of this publication, Mr. Cox stated, in regard to the organization of the Superior Bonanza Mining Company, which was organized to take over the old company that the proposition offered the stockholders has not been accepted yet. The new company offers 25 cents per share for the old stock, or will give one full paid non-assessable $10 share in the new company for forty shares in the old. He further stated that the new company has already paid off $21,000 of the debt, and are taking care of 1,200 shareholders controlling 860,000 shares. The new company is at present raising money to carry on development work.

George C. Young of the Greene-Cananea was in Bisbee this week to meet Col. L. W. Powell in regard to matters pertaining to his company. Mr. Young stated that no word has yet been received as to when operations would resume. He said that Cananea is far from being a deserted camp, as 10,000 men, women and children are estimated to be within the city. Repair work is going forward rapidly, also the installation of new machinery, and when the company resumes it will be enabled to produce at a reduction compared with the old system.

At the Emerald shaft of the Tombstone Consolidated at Tombstone, Ariz., the copper strike of recent date is assuming larger proportions. So far over 35 feet of the ore body has been gone through in the winze below the 800 level. The ore is of a black sulphide nature running as high as twenty per cent, carrying considerable silver and lead. A drift has been started from the winze and five feet of ore has been passed through. The ore is below the water level, which leads to the belief that the body is of some size. The company is preparing for the installation of a new hoist and the sinking of a new shaft on the property. The hoist house of the Lucky Guss mine is being rebuilt after the fire which destroyed it recently. The amount of water from the properties of this company has been reduced from 5,000,000 to 4,500,000 gallons during the past few weeks. The outlook for the Tombstone district is very favorable.

The Harqua Hala Mining Company, operating the famous old Bonanza properties at Harqua Hala, 100 miles northwest of Phoenix, is preparing to put in a large cyaniding plant for the reworking of about 200,000 tons of tailings, and for the further reduction of ores direct from the mill, which show a large loss of gold values at present. The company is operating forty stamps most of the ore coming from the Golden Eagle claim. Much of the stock of this corporation is owned in Los Angeles, L. P. Stevens of that city being vice-president.

Th re has been no diminishing of activity in the Quartzite district of northern Yuma county, wherein the greater part of the product is gold. The New York and Plomosa company, which has a mine remarkable for the coarseness of gold found in a hard quartz formation, is building a seven-mile pipe line from Quartzite to the mine, and will put in a roller process, believed especially effective on its class of ore.

In this same vicinity lies the only quicksilver mine now being operated in the Southwest, on which is being built a thirty-ton reduction furnace.

Picacho and Eureka districts are about to become the scenes of much of that activity which made them rich and famous camps in years gone by. The Picacho people are dismantling their huge 1400-ton mill by the river, and are transplanting the major portion of it to their present mill site, three miles inland on the California side. The old mill was the largest in the West. Mr. Clark of Los Angeles and eight men are attending the removal. At the mines twenty-three men are at work.

Blacksmiths $5.50 from $6.
Tool sharpeners $5 from $6.
Blacksmith helpers $4 from $5.
Surface laborers $3.50 from $4.50.
Amalgamators $4.50 from $5.
Vanner men $4 from $5.
Laborers $3.50 from $5.

"Resolved, That no member of this association employ in or around his mine or around his mill any member of Goldfield Local Union No. 220 of the Western Federation of Miners, or of any union conected with or affiliated with said Western Federation of Miners and that all men hereafter employed by any member of this association in or around his mine or mill be required, as a condition of business employment, to sign a written contract which contains an agreement that the miner is not now, and will not be during the time he is working, a member of the Goldfield Miners' Union No. 220 of the Western Federation of Miners or of any other union in Goldfield or elsewhere that is directly or indirectly affiliated with or has any connection of any kind, nature or description with said Western Federation of Miners.

"Resolved, That the mines of the Goldfield Mining District resume operations at 7 a. m. on Thursday, December 12, 1907, with men who agree to the foregoing conditions and that all old employes of the members of this association be given the preference at all mines, providing such employes present their application either at the office of this association or of the mines formerly employing them, before 7 a. m. of Thursday, December 12, 1907, and that the office of this association and of said mines be open for the purpose of receiving said applications from 9 a. m. to 6 p. m. on each day until said time.

"Resolved, That it is the sense of this association that the cost of living in the Goldfield Mining District be reduced at least twenty per cent from what it now is, and unless this be done within a reasonable time this association will construct and operate a general merchandise store or stores and boarding house that will guarantee to the men employed in and around the mines and mills a reduction to this or a greater amount."

It is now certain that the first mill in Wonder will be erected on the ground of the Ajax Wonder Mining Company. A. C. James, general manager of the company, received this week a letter from Luther Elkins, secretary, to the effect that T. W. Treanor, who was in Wonder two weeks ago investigating the milling outlook, has a high opinion of the Ajax property as a milling proposition, and has after consideration completed negotiations with the directors of the company to take over a substantial interest and to erect a mill. The talk so far has been for a ten-stamp mill to treat the product of this one company, but before the plans are completed the feasibility of a custom mill, of much larger size, will be carefully considered. It may be that a Lane mill will be installed. It is estimated that the ten-stamp mill will cost about $50,000.

Instructions have been received by Mr. James to ship at once six tons of Ajax ore to California where it will be tested for the purpose of ascertaining the best process for its treatment here on the ground. Some of the ore has already been tested in California mills with gratifying results. There are on the Ajax dumps about 300 tons of ore, the greater part of which is of milling grade, and will average according to the careful estimates made by Mr. James, $24 a ton. There is, however, considerable shipping ore, with values as high as $300, and a percentage of gold that is unusually large for the Wonder district. But the conclusion has been reached that the Ajax is essentially a milling property; hence the mill.

At Tonopah last month the Silver Bow Belle Mining Company purchased from the Lincoln Mining Company its ten-stamp mill at Ellsworth, and the first payment was made Thursday. The plant is an up-to-date Allis-Chalmers mill, with stamps weighing 1050 pounds each, and equipped with an eighty horse-power boiler and a fifty horse-power steam engine. The machinery will be transported from Ellsworth to Silver Bow, a distance of 120 miles, by mule teams, and it is calculated that it will be installed by the first of January. It will be erected on the ground of the Silver Bow Belle Mining Company only a few hundred feet from the main workings, where the three lucky Swedes are now extracting $300 ore from their lease.

Latest reports from Silver Bow state that the rich streak in the tunnel on the Silver Bow Belle property is maintaining its values and that a shipment will soon be ready. The road from the mine to the main wagon road is practically completed.

The Catlin Mining Company sent out a shipment of twenty-eight tons which will run a little over $100 a ton. The ledge maintains a width of eight feet, one-third of which goes into the sacks.

C. W. Girton let a lease on his property to Nels Peterson of Goldfield, who began work at once. The Girton property, which is known as the A. D. S. group adjoins the Silver Bow Belle and has excellent surface indications.

A contract has been let to sink a well at a point about half way between Silver Bow and Tonopah, at the junction with the Goldfield road. The movement was headed by C. W. Girton & Son, who subscribed to the fund, and the County Commissioners have signified their intention of taking the matter up at their next meeting.

City of Mexico

Dec. 15.—The approaching centennial anniversary of Mexican independence is attracting considerable attention, not only at home, but abroad. It will properly be an international exposition, and will be held in the City of Mexico under the auspices of the government some time during the coming year, the dates of which will be announced later. Mexico will make representative exhibits from all the various departments of her industries and invite the United States, Europe and other countries to a friendly competition. Mexico is forging to the front in great shape, and she is inviting other nations to come in and look over her resources, her progress and the thousands of opportunities that are open to capital, enterprise and citizenship. Mexico abounds in vast resources that invite development.

She has also many scenic wonders that are unique and marvelous; and the grandeur and glory of her mountains and valleys, her ancient cities, rivers and sea coast harbors, beautiful forests of mahogany and other timbers, rich mines both ancient and modern, and many other attractive features will certainly interest a high class of sightseers from all parts of the civilized world. The exposition will be a great educational feature, in that it will let the world know the capabilities of Mexico in the diversity of her industrial resources, her arts and sciences and the marvelous progress she has made in the last quarter of a century.

In mining, manufacturing, agriculture, railroad building, irrigation, education and other departments of advancing civilization Mexico has kept pace during the last two decades with some of the foremost nations of the earth. Capital and immigration have planted their banners in hundreds of places on her mountains and in her valleys, and they have dotted her rivers with marts and cities and are waking up industry in every part of the republic.

When President Diaz steps off the stage of action we are in hopes his successor will follow faithfully in his footsteps and carry out his govern-

Hoist men, double drum	4.00
" single drum	3.50
Teamsters	3.25
" helpers	3.00
Fitters of surface	3.50
Pipe men, underground	3.50
Track men	3.50
" helpers	3.00
Railway dump car loaders	3.00
Hammers men	3.50
Top men	3.00
Ditchers	3.50
Mill men	4.00
" helpers	3.50
Oilers	3.00
Watchmen	3.00

Officials of the Granby Company, when asked if they had any statement to make regarding the situation, declined to have anything further to say other than that the company intended to give all men applying a chance to go to work; and that it was the intention to operate the mines if the men showed up for work, otherwise it would appear that the mines will remain closed for the rest of the winter at least, and no one knows how much longer.

Reports from Grand Forks regarding the situation at the smelter are to the effect that members of the union there are not disposed to accept the reduced scale offered by the company, officials of both Phoenix and Grand Forks unions having sent telegrams to outside papers to that effect.

The following are the reported ore shipments and smelter receipts in the Southeastern British Columbia districts for the week ending November 23, 1907, and the year to date, in tons.

Shipments.

District.	Week.	Year.
East of Columbia River.	3,689	156,714
Rossland.	6,407	249,742
Boundary.		1,139,309
Total.	10,096	1,545,765

Smelter Receipts.

Smelter.	Week.	Year.
Trail.	8,080	237,542
Marysville.	600	28,200
Northport.	919	88,529
Boundary.		1,110,079
Total.	9,599	1,464,350

Notes From the Trail

By E. A. Hayes,
Los Angeles Representative, M. & M.

The Whipple Mountain Mining Company doing business in San Barnardino county, California, are hustling these days. A new hoist and machinery is in place and the outlook is "beyond the dreams of avarice" as the general secretary remarked.

Mr. Carrigan, president of the Clara mine near the Bill Williams Fork up in the northern part of Numa county, Arizona, wears a broad happy smile these days. Gold is every where and every piece of rock they crack open has big nuggets in it. The Clara is a hummer.

The Butte Creek Consolidated Dredging Company own 1,500 acres of placer ground in Butte county, California. They dig a hole in the desert, plant their dredge, let in the water and go to work. They wash out the gold on board, throw their tailing behind them and keep moving. They gather about 50 cents a square yard and work 2,000 square yards daily. The gravel after it has been washed is leveled, covered with soil and planted with orange trees.

At Oroville millions of dollars have been dredged out and many outfits are at work. It is a big flat country and they dig up farms, fruit trees, etc. After the scourge of the dredge another company comes along buys the land and rocks left behind, cover it with dirt and another farm is for sale. Relics of the old 49ers are yet visible in the Feather river region.

Mr. C. W. Benedict has made what may prove to be a big strike about thirty-five miles west of Kingman in Mohair county, Arizona. A few days ago he found an immense east and west ledge running high in gold and copper. He has located his claims and those who pretend to know say a second Bisbee is in sight. Mr. Benedict is lucky and he deserves to be.

John D. Shaffer, a hustler from Salt Lake City and general superintendent of the Gray Eagle Gold and Copper Company, has a big mine in sight in the northeastern part of Riverside county, California. The property is in the Santa Marie mountains and in the near future will receive further favorable mention.

A few days ago General Manager Howbert piloted a mule train of matte from the Cieneguita Copper Company in the Sahuaripa district, Sonora, Mexico, to Chihuahua. There were 162 sacks and the bunch netted over $5,854. This mine is fast making its way to the front as one of the great mines of Mexico, or any other country for that matter. This mine runs high in copper; but it is so enormously rich in gold and silver that the price of copper does not affect it.

D. Y. Warfield, a prospector, has struck a ledge of tungsten in the northern part of San Barnardino county near Kelso. The vein is about eighteen inches wide and runs about thirty per cent.—some of it better than that.

Dudley and Mosely, two bright, active young mining men doing business in Los Angeles, recently sold the Desert Queen mine in the Manhattan district, Nevada, for a large sum and incidentally benefited themselves as well as the others concerned in the deal. The Desert Queen is a mighty good piece of property in a good section.

Much prospecting is going on in the Superior district of Pinal county, Arizona. New finds are being opened up and the development business is brisk. The Silver Union recently made a rich strike. The ore here is mainly gold with good showings of silver and copper.

There seems to be a fashion in the making of prospectuses nowadays. A few years ago a few rough written or printed lines told the tale of a mine. Now the story is told in the highest style of the printer's art. Some of them are as gaudy as a poppy and the contents equally as highly colored. After all it is pay dirt that counts and the question "Does it pan?" does not change in meaning any by reason of a gilt edged prospectus.

Past his three score years and ten, Mr. C. S. Lane, the manufacturer of the Lane steel slow speed roller quartz mill, is doing business in Los Angeles. He is erect as an Indian and keen of eye as an eagle. Square as a brick in his business deals he has made a name that will be enduring as well as a mill. Thousands of testimonials tell of the worth of his machinery.

The Woman's Mining and Stock exchange of Los Angeles is doing good work. Many of the best ladies in the state belong to it, and its affairs are conducted on a high plane. They succeed oft times in measure beyond the ken of men. This association has demonstrated that women are not a failure in the art of doing business. The exchange is gaining strength and financial influence daily. It has many patrons among the fair sex.

Deveraux Bros. have purchased another large group of mining claims near Crystal lake in San Barnardino county, California, and will at once establish a camp and commence development work. They are hunting for the yellow metal and those who know say that a bonanza is in sight.

Up in Kern county, California, near Johanesburg, perhaps two miles south, is an enormous bottom side up bowl shaped formation of red iron hematitite. It is of volcanic origin and can be seen and distinguished for miles. People in the vicinity gather the red oxide and use it for paint. Few have ever explored it. It is a wonderful land mark.

A standard boiler horse-power as adopted by the American Society of Civil Engineers is the hourly evaporation of 3.55 gallons of feed-water at a temperature of 100 degrees Fahrenheit and seventy pounds guage pressure or 33305 British thermal units per hour.

steam hoist, air compressor, air drills and a No. 9 Cameron sinking pump, have been placed in commission and sinking in the shaft is now progressing at the rate of two and one-half feet per day. Arthur A. Pierce of London, consulting engineer of the company, will make a favorable report to the London stockholders who recommend the erection of reduction works.—An engineer has recently been sent to the Twin Buttes property to put all the machinery in readiness for the reopening of the mine, which it is expected will occur immediately upon the return of Mayor Rose from the East. At the present time there are some twenty men employed at the Twin Buttes, when under ordinary circumstances several hundred men are kept on the company's pay roll.—The concentrating mill of the Kelvin-Calumet Company at Ray is working steadily and it is claimed that the company is producing copper at a gross expense of not over 7 cents per pound.—The pumps have been pulled out of the main shaft of the Lake Superior and Arizona mine at Superior, a move which indicates that that well known mine has closed down for a lengthy period.—A Texas company has purchased the old Vekol mine, near Casa Grande, and announcement is made that the property will be worked on an extensive scale in the very near future.—At Ray another mill is expected to be started up at an early date. The Hercules and Arizona Company has already resumed operations there.

Santa Cruz County.—A full force of miners is being employed by the Mansfield Company which has a pay streak in the Black Cap mine from two to three feet in thickness, containing high grade gold, silver and copper from which another shipment of forty tons is about to be made. Development will be continued throughout the winter.

Yavapai County.—The Mescal Mining Company has been incorporated by Sam B. Adams of Little Rock, Ark., and J. E. Leeper and W. C. Miller of Jerome, with a capital stock of $1,500,000, and owning seven claims near Jerome, three, the Steamboat, Mescal and Monmouth, being patented, and the remaining four unpatented.—In the past month the shaft on the Arkansas and Arizona, near Jerome, was sunk eighty-three feet, bringing it to the 552-foot level.—A 700-foot tunnel on the Olympia claim of the Two Republics Mining Company was begun on the 27th of last month.—Work on the Cleopatra and Hill Copper Company is being continued under the direct supervision of Foreman Hubbard, General Manager Hull of these companies having gone to Philadelphia, Pa., on mining business.—Development in the Little Daisy, in the way of shaft-sinking, is progressing. The depth attained, over 600 feet, is about the capacity of the present plant, and a more powerful one will be installed with which to continue the sinking. A sample from the full face of the Bullfrog tunnel on the Mazatzal Copper Company's property gave fire assay returns of four and two-tenths per cent. copper.—Plans look to the reorganization of the Arizona Smelting Company, whereby the indebtedness of the company may be paid off and operations at the Humboldt plant resumed.—A new 150-ton pulverizing mill with cyanide equipment has been received at Phoenix for shipment to the Fortuna mine, north of this city, in Winifred district. Power and lighting for the works and camp will be furnished by electricity, and the equipment is to be of the finest and most modern character.

Yuma County.—In a crosscut tunnel started in lime to run into the mountain to cut a four-foot vein carrying twenty-two per cent. copper on the surface, operators of the San Domingo property twenty-five miles northwest of Benson, adjoining the Valenzuela group, cut a blind ledge of rich copper ore six feet wide and carrying both black and red oxide and quantities of excellent malachite.—The Anita Lead & Silver Mining Company is preparing to develop three claims purchased from a Mexican who located them a year ago, and have already proven up three pay streaks containing horn silver and galena which assay from $76 to $107 to the ton. A hoisting plant to cost from $3,000 to $5,000 will be installed.—Operators on the Thumb Butte property will erect a mill if results are favorable from assays on ore from a strike in the Mystery shaft at a depth of forty-five feet.—The Juniata Gold-Copper Company of California has transferred its group of gold-copper claims in the Seneca district to the Juniata Gold-Copper Company of Arizona. These properties include the Jessie, Bill Nye and Double A1 and 2.—John R. Young has bought Wingate Lindsay's big properties four miles east of Yuma. These claims show a red gold-bearing quartz and promise well.

CALIFORNIA

Butte County.—Gravel running $23 to $80 a cubic yard is reported to have been struck in the Lynch mine on Snow mountain near the old camp of Kimabew. The channel was intersected by a tunnel which was driven for two years.

Mono County.—The Great Western Oil Company will drive its first well near Mono lake as soon as the lumber and machinery have arrived.—The new ten-stamp mill at Masonic, the gold camp near Bodie, built by Wils Brougher and associates of Carson, has started on its initial run. The mill is operated by electricity throughout and is equipped with modern machinery in every department. Masonic is producing a large tonnage of high grade milling ore, and the mill will be kept busy grinding out the values.

Plumas County.—The Plumas-Mohawk Mining Company will place one-half its 200-ton quartz mill in commission on December 9th. The mill, consists of specially designed shaking screen feeders, two Hathaway fine crushing gyratory crushers, four overhead-driven five-foot Huntington mills, plates, and the whole plant operated by water power generated through 650 feet of 12-inch pipe operating a four-foot Pelton wheel under a 235-foot head. The mill is automatic and but one man on a shift will be required to operate it.

The properties of the company consist of nearly 1,000 acres of mineral land, most of it covered with magnificent timber, situated immediately north of the famous Plumas-Eureka mine which has produced millions. Only one-half the plant will be operated before next May, owing to the impossibility of completing the covering of the power ditch this season, but after May, 1908, the total plant will be treating ore.

San Bernardino County.—Orders for pipes and tanks have been given for the new mill at Crackerjack and a test shipment has been made to Los Angeles in order to determine the best process to be employed.—It has been decided to employ a full force of miners on the Surprise tunnel and to drive the bore as rapidly as possible. It is said that the Bonanza Company has refused a $5,000 bonus for a lease on the Owl claim.

San Diego County.—The big 1,400-ton mill of the Picacho people on the Arizona side of the line has been dismantled and transported to the new site three miles inland on the California side.

CANADA

British Columbia.—Granby mines have not resumed as was reported. Miners approached the management of the Granby Consolidated asking that work be given under the scale of wages paid about a year ago and now in effect at Rossland and Butte. Accordingly it was decided to open the

mines and smelting works about December 5th. At a meeting of the Phoenix Miners' Union No. 8, however, the reduction of 50 cents a day was discussed and refused by a unanimous vote.—Thirty tons of ore were shipped during the first week of December from the Evening Star mine in the Boundary district to the Trail smelter by Andrew K. Idler, who is operating the property after a shutdown of six years and who expects to ship at least 1,000 tons during the next six months. —It requires five hours' operation daily to keep the water out of the Dominion Copper Company's Brooklyn mine, a No. 7 Cameron pump being used for the purpose.—A press dispatch from New York stated that the directors of the Granby Company at the monthly meeting that day, decided to postpone action on the usual Christmas dividend.—A car of high grade ore was shipped recently from Midway to the Trail smelter, being from the Duncan up the west fork. The Sally has shipped a car also, both cars being hauled on wagons to the railway.

COLORADO

Boulder County.—A large parallel vein running into the Livingston lode of the U. S. Gold Corporation on Sugar Loaf mountain, has been discovered and timbered for a distance of 100 feet. The heading of the Sugar Loaf tunnel has now advanced over 700 feet. Tests are being made on large quantities of ore from the mines and in a short time plans and specifications will be submitted for the company's new cyanide mill.—On the Sun and Moon group in the Sunshine district drifting is in progress on the 125-foot level. Numerous small streaks carry $8 a pound for the first class, $1 a pound for the second, the lowest grade being a high grade milling ore mixed with much tellurium.—Brown and associates have shipped two carloads of test ore from the Golden Queen at the head of Spring gulch in the Ward section and realized a substantial profit.—Work is to be resumed on the Blue Coat on the north side of Left Hand creek, by Superintendent C. W. Strong, who will in the spring put up a shaft house and install hoisting machinery.—Martin Bossen has resumed work on his Bald Eagle group on the south fork of St. Vrain creek, consisting of three patented lode claims, a twenty-acre placer and a five-acre mill site. Samples from the Bald Eagle run from thirteen to forty-five per cent copper.—The adit level on the Old Sal claim has cut the shaft 260 feet from the portal and high grade sulphides are being taken out.—It is reported that a recent shipment made by Flood and Voightlander, who are mining east of the Trevarton ranch in the Nederland district, to the Wolf Tongue mill, netted them close to $1,000.—A contract has been let by the Boulder County Mining company to sink the shaft of the Lone Tree mine an additional 100 feet.—The Wolf Tongue mill is running two shifts and is taking the ore from the surrounding mines as fast as it can handle it.—It is reported that negotiations are pending for the sale of the Snow Bird mine at the head of Spruce gulch, now owned by H. N. Coffey.—About thirty leasers are working at good profit on the Ni-Wot through the Big Five tunnel. A mill for treatment of the great quantity of low grade is much needed.—The new owners who bought the old Boston mill of the B. & M. Co., are repairing the mill building, and it is reported that machinery is soon to be installed to operate by the process of Prof. Johnson.

Chaffee County.—The streak of black talc in the east drift of the Gold Bug at Turret has increased in width to about six inches. About fourteen inches of vein matter heavily impregnated with sulphides lie next to the talc. The west drift has been extended along the north side of the wall to a point opposite the ore shoot. —F. W. Schofield has resumed work on his property half a mile north of Turret.

Clear Creek County.—The Two American Sisters concentrating mill on Columbian mountain, which has been remodeled and enlarged by ten stamps, is now running night and day and a heavy tonnage of lead and zinc concentrates are being turned out. The electric plant of the company, situated below Georgetown and generating 315 horse power, supplies the mill and compressor with 200 horse-power, the remainder being consumed by other operators on Columbian mountain.—Wm. Cramer, operating the Lost Treasure group of five claims up Silver creek on Columbian mountain, has uncovered a number of feeders in the adit tunnel forty feet from the entrance, which measure from one-half inch to two inches in width and assay 500 to 1,380 ounces silver to the ton. —Four Georgetown men have secured a group of nine claims in the Peru district and have advanced a crosscut tunnel for a distance of sixty feet, besides erecting a cabin and blacksmith shop.—The Ruby Mountain Gold and Silver Mining company, owning a group of seventy-one lode claims in the Peru district, is driving two tunnels, one in 125 feet and the other 135 feet. A plant of machinery will be installed early in the coming year. W. B. Lewald, of Pennsylvania mine fame, is general manager for the company. —M. J. Riley has made another strike on the Grant level of the Sunburst, where a lease was taken upon 300 feet of ground to the west of the strike of a few weeks ago and a streak encountered almost identical with that mined in the east drift.—An eighteen-inch streak of lead ore is reported in the bottom of the shaft on the Collins group of three claims, bonded and leased for $7,500 by the Premier Mining, Milling and Leasing company.—Harry Ratholz and associates, leasing a block of ground on the Centennial mine of the Kennedy Gold Mining and Milling company, have made a twenty-ton shipment of ore assaying from two to three ounces gold and twenty-five ounces silver to the ton.—The Brittle Silver Mining company, owning a group of six patented claims and thirty-three locations in the Peru district, has awarded a contract for the driving of its crosscut tunnel, now in 300 feet, a distance of 4,000 feet. McCoy and Kennedy of Chicago, who are financing the undertaking, will install a plant of machinery next spring. —The new 100-ton concentrating mill being erected by the Capital Mining & Tunnel company is nearing completion, and it is expected to have the machinery ready to put into commission some time during the coming month.—Work has been resumed in carrying the raise from the west Phillips drift run from the Burleigh tunnel, to connect with the Seven-Thirty shaft workings.—What is believed to be the Choctaw vein was encountered in the breast of the Mohawk tunnel, being driven into Saxon mountain by the Accord Mining & Tunnel company. The vein is four feet wide and the mineral is almost solid and believed to be of a smelting grade.—Manager Stephens of the Metropolitan tunnel at Idaho Springs states that the tunnel is being driven ahead six feet every 24 hours. The face will be increased and 200 feet a month will soon be the average. The heading is in a spar and granite formation.—The Big Five company has filed a mortgage on all of its property to the Continental Trust company to secure the payment of $250,000 in 10-year 6 per cent gold bonds. The company proposes to sell only $50,000 worth of the bonds at this time, which, together with the funds on hand, will enable it to prosecute the driving of the Central tunnel.

Gilpin County.—On Sunday afternoon, December 8th, the lateral from the Newhouse tunnel connected with the bottom of the Old Town shaft at a depth of 2,186 feet, the event being

not expected for several days. The Newhouse tunnel is 4,326 feet long. Fine bodies of ore in the bottom of the shaft and lateral will be broken down and shipped through the tunnel to the Idaho Springs mills.—Sternberger brothers are building a new shaft house and installing a steam hoisting plant on the Ipava mine in the Russell district. The shaft, now down 306 feet, will be sunk 300 feet deeper during the winter. Some of the ore taken out runs as high as $150 to the ton. As soon as the property is sufficiently developed a concentrating mill will be put up.—On the Pittsburg in lower Russell, the property of the Cashier Gold Mining and Reduction company, about thirty men are at work and connections have been made with the winze from the 700 to the 800-foot level on the east side of the shaft. At the 800-foot level on the west side, 150 feet have been driven in hard rock. Reiva & company on the east side of the 700-foot level recently made a shipment which carried gold values of 13.50 ounces, or close to $300 per ton, while Vincent & company sent a lot to the sampling works which carried gold values of ten ounces, fifteen per cent copper and silver values of nearly $250 per ton.—Ore from the 400-foot level of the Chase shaft in Willis gulch assayed 200 ounces gold to the ton, or over $4,000, the ore being a black sulphuret. Work is being done on three levels on both sides of the shaft, mostly on leasing account. A shipment by leasers this month from the 300 east level brought values of between five and six ounces of gold per ton at the sampling works and a lot of ten tons was shipped by leasers from the 200 west level which netted about $50 per ton.

Gunnison County.—The Raymond Consolidated Mines company has advanced its tunnel in the Bowerman district a distance of nearly half a mile with a vertical depth of 1,000 feet on the ore. Thirteen veins have been opened, comprising thirty feet of ore worth about $10 a ton. The mill is treating 100 tons of ore a day at an expense of forty-eight cents a ton. —The Carter tunnel is now 3,900 feet in the mountain.—The Sandy Hook company, owning a group of twenty claims in the same district, has driven a tunnel over 150 feet, the Chronicle extension to be intersected at a depth of 700 feet, being the objective point. —The lower Climax tunnel is in about 900 feet, encountering a foot of ore that runs over $60 to the ton.—On the Navajo property, on which a tunnel is being driven to intersect the famous Independent vein, a lateral on a cross vein has been run forty feet, showing from eighteen to twenty-four inches of quartz, which will average above $15 for the width of the breast.—The tunnel on Abe Lincoln No. 2 is in 570 feet and on No. 3 the tunnel has been driven 225 feet. Two other tunnels have been advanced 240 and 350 feet respectively.—Ore from one vein is supplying material for twenty stamps in the Gold Links mill and it is probable that the entire forty will be put in commission.—The amalgamating mill of the Brant Independent Mining company has been started on ore from the Camp Bird mine.—At the North Pole mine at Crested Butte, which has been equipped with a large gasoline compressing plant and up-to-date drills, the company proposes to drive in the lower tunnel and determine if the ore showing in the contact, 2,500 feet above, contiues to that level. A large amount of supplies have been laid in, and work will be vigorously prosecuted all winter.—Ore from the Empress mine, being a high grade galena, is greatly desired by the smelters, who treated a consignment last summer not only free of charge, but paid the freight expenses. Shipping will be continued during the winter. —The new tram at the Augusta mine has been practically completed, but owing to difficulties with the forestry authorities, which has caused Manager Arzeno a trip to Washington, it is possible that the mine will be shut down.—Work on the Maroon mountain tunnel has been discontinued for the winter.—The new Lyner air drills on the Mountain King have been put in operation.—The Forest Queen management will put in larger air drills and thus be in better shape to bore the hard rock in the mine.—The tunnel of the Gold Links company is now in over 3,200 feet and is producing steadily, the ore being treated at the company's mill, which is to be increased from 100 to 300 tons a day in a very short time.—Contractor A. A. Miller, who is building the Blain mill, has all the building enclosed and expects to have the machinery set up and in operation by the first of the year. The main East river stream will furnish the power through turbine wheels set near the mill. Wilfly tables are to do the concentration, while vanners will follow in treating the slimes, by which method a saving of above ninety per cent of the crude material may be anticipated.

Hinsdale County.—The Highland Chief company will prosecute no further development on its property until spring.—Wise and Hart have begun work on the F. X. Aubrey, which they recently took under lease and bond.—Mr. John S. Hough has bonded and leased the Fanny Fern property to Mr. Peter Baird, who commenced to develop the lode this week.—The Pelican management have commenced sacking their ore and will very soon start to pack it from the ore house to the wagon road, getting in readiness to make a shipment.

Lake County.—It is understood that the Bingham Consolidated Mining and Smelting company of Bingham, Utah, will build a large custom smelter in the Leadville district.—Steady shipping mines in the Leadville district are the Ibex, New Monarch, Fanny Rawlings, Big Four, Silent Friend, Tucson, Yak, Adama and Wolftone, Stars, Yankee Doodle, the Down-Town group and the Fryer hill group.—The production of Leadville for the month of November shows a considerable decrease, mainly owing to the refusal of the zinc smelters to pay cash for the ores.—The Coronado and Penrose are taking out from 175 to 200 tons a day of carbonate and silicious ore, and a steady campaign of development and drill work is continued. This latter is necessary, as the geological formation is complicated.—The company which has leased the Rock hill territory covered by the Raven, Only Chance, O'Sullivan and other claims, has just completed the erection of a substantial plant on the Chance, and is preparing to handle the ore which is exposed in the old workings.—The ore body opened in the Coon Valley continues to improve as development work proceeds. It has now opened into a fine body of lead-silver carbonate, and shipments will soon be the order of the day.—Manager Lippincott of the American Zinc Extraction company's mill stated that the plant had no intention of closing down. There are large stocks of ore on hand which are being worked, but extensive purchases are not being made in the present state of the market.—The Bohn shaft is taking out occasional shipments of iron of fair grade, and considerable prospect work is being carried forward.

San Juan County.—In the breast of the tunnel on the Broad Gauge property in Burns' gulch, operated by Con Burns and son, there is a streak of solid ore from four to five feet wide and assaying 42.5 per cent lead with values of about $8 to the ton in gold and silver.—Although there was a decrease in the crude output, the ore shipments from Silverton for the month of November exceeded those of any preceding month of the year, the concentrates being more than sufficient to make up for the extra tonnage. For the month a total of 9,129 tons of ores and concentrates were shipped, being 3,000 tons more than the October production.—The Treasury tunnel at Red Mountain is now in

tance of 5,000 feet and prepara- are being made to employ a force en during the winter.

mmit County.—A new company the Denver Ores company, ced by Pittsburg capital, has over the old Wire Patch mine mill, long inactive, on Farncomb and after remodeling the plant begin active operations. New rical machinery is being pur- d in Denver and will be installed ce.—Manager Ed. P. Jones, man- of the Arctic mine near the head e Blue, has placed orders with a er firm for a complete stamp and ntrating mill to be erected at —The Sallie Barber, near Breck- ge, has closed down owing to the metal market.—The Reliance ger discontinued operations on mber 8th, having worked later into inter than in any preceding year. is reported that $27,000 in im- ments will be spent on the Sen- mine up the Blue river.—In driv- a crosscut in the lower tunnel the Jamison lode in the Snake district, E. W. Fairchild has d up a streak of quartz sprinkled lead ore measuring three feet dth and running from $75 to $125 e ton.

ler County.—It is reported that applications are now before the gement of the El Paso Consol- d Gold Mining company for block , known as the Seller. The prop- has been divided into twenty-six s, all of which will be leased.— said that out of approximately men employed in the Cripple district, 1,800 are now members e Western Federation of Miners hat the number is growing rap- —After a struggle of three months Big Four Leasing company has tered the main shaft of the Car- e Queen mine on Battle moun- and two veins are now exposed, being a vein four feet wide of ing grade in the 500-foot level, ed with sylvanite streaks that from $200 to $1,280 and lie in center of an eight-inch streak. other is at the 400-foot level and ir feet wide with values averag- 20 a ton.—Ore of about one ounce is reported on Nipple mountain, iles south of Victor. The find made by E. A. Roberts, postmas- t Wilbur, just across the line in ont county. The vein was en- ered in a tunnel and is reported feet wide.—Work has been d on the Last Dollar mine on hill, under lease to John T. Dal- state commissioner of mines, and ssociates. The shaft has been below 100 feet and the mine has ced more than $1,000,000.

El Paso County.—The Golden Cycle mill in West Colorado Springs is now running at a capacity of 450 tons daily and by the first of the year will be running at the full capacity of 900 tons a day. In the reconstruction of the mill all the ideas utilized in the old Telluride mill were discarded and everything planned along new and different lines. The plans have been made and the construction of the building has been supervised by the ablest mechanical engineer in the United States, Mr. Franz Cazin of Denver.—General Manager A. D. Hawkins of the United States Reduction & Refining company, better known as the mill trust, issued a statement on December 11th, stating that on account of the conditions at Cripple Creek the regular quarterly dividend on the preferred stock of the company would be passed on January 1. It is understood that this move is made to gather a fund to fight the Golden Cycle mill, which has cut treatment rates.

NEVADA

Douglas County.—The Honest Endeavor will resume work with a full complement of men on the first of the coming month and the Union Blue started up about the 15th of December. Richards & Grant have taken over the famous Champagne lease on the Kennedy Consolidated ground and are rushing work to the full capacity of facilities. In the drift on the 100-foot level a large body of high-grade ore has been blocked out and is being sacked and piled up on the dump ready for shipment.

Esmeralda County.—The Florence at Goldfield has resumed after an agreement by the miners to accept scrip and about thirty are employed.—Eight leasers at Rawhide are sacking ore that runs from $200 to $1,000 a ton. Several capitalists are planning the erection of stamp mills in the coming spring.—The Annie Laurie mill of the Gold Mountain Consolidated Gold Mining company has been repaired, and with a capacity of 6,000 tons monthly, is producing $1,000 worth of gold bullion a day, which will be sent to the Selby smelter at San Francisco and settled for in coin. The wet process of treatment will replace the present dry system next spring.

Elko County.—Six strikes were made within a radius of two miles of Gold Circle, none assaying less than $284 in gold. The deepest shaft is down 20 feet. The nearest railway point is fifty miles distant at Golconda.

Humboldt County.—Over 100 miners are busy in the camp of Goldbanks, fourteen leasing, and the deepest shaft is down 100 feet on the Blair lease.—O. V. Cole, one of the lessees operating the King and Hanson lease on the Fine Gold ground in Seven Troughs, after firing three rounds of shot, encountered several feet of heavy iron sulphide from which assays ran as high as $90,000 in gold to the ton. Colorado capital will be invested in machinery for the further sinking of the mine.—Drifting and crosscutting are in progress at five levels of the Fairview and specimens assay as high as $100 a pound.—The Manoa Mining company has a 1,600-foot tunnel with $1,000,000 worth of ore blocked out on its property in the Indian Valley district.—Operators on the Bonanza King in the same district are shipping ore that runs from 400 to 500 ounces silver and $50 in gold to the ton.—Seven leasers are at work in Camp Toben and many applications are being made. An eight-foot ledge in the breast of a drift in the tunnel driven on the Nevada Maid property of E. P. Waldo and partner samples from $36 to $175 in gold and silver, mostly in the former.—An eight-inch streak on the Squires lease on the Dandy claim of the Hill property runs $1,600 in gold to the ton.—On the ground of the North Pole Mining company, near Wild Horse canyon, at a depth of some 30 feet, a regular ore body showing values ranging from $9 to $1,700, is opening up.—Adjoining the North Pole, Smoot and Horsberger have trenched a vein for 300 feet and found colors in every place. An incline shaft has been started.—The Mazuma Water company has helped to make a good road to the head of the canyon. —E. J. Sweeney of Sweeney & Egan, the Vernon mining firm, has just closed a deal whereby his firm secured control of the Big Dipper claim in the Seven Troughs district.

Lyon County.—On the Ludwig property at Yerington a body of thirty-five per cent black copper oxide has been crosscut for twenty-seven feet and shipments have been already made to the smelters.—On the ground of the Walker Lake syndicate the main shaft is down to a depth of 100 feet and ore is being extracted and sacked for shipment. The employes here are converting the bulk of their wages into stock of the company. The wagon road from the mine to the main line of the Nevada-California railroad is completed.

Lincoln County.—The Quartette Mining company is now making arrangements for the erection of a big cyanide plant for the treatment of its mill tailings. There are approximately 175,000 tons of tailings on the dumps averaging $4.50 to the ton.

Nye County.—The Midway at Tono-

pah is developing the big vein at the 800 level, besides mining and shipping the usual quantity of ore from the upper levels.—The Montana is developing on the fourth and below the fifth level.—The North Star is developing at the 1,250 and is sending some ore to the Montana mill from the 900.—The West End is doing such work as seems best to prove its contention in the coming suit with the MacNamara.—On account of the financial condition, it was deemed advisable to stop work at the California for the present.—Ore worth $1,000 a ton was recently brought in Rhyolite from the Glover-Badgett lease on the Ramsey property at Willow creek.—The last consignment of the ten-mile pipe line of the Round Mountain Hydraulic company has been delivered, and two two-inch pipes will be put at work as soon as the full water pressure is available. With less than thirty miner's inches of water, from $500 to $1,000 are now being daily cleaned up and shoveled into the sluice boxes by three shifts of men.—On the 50-foot level from the main shaft on the Sunnyside at Reveille, at a point 24 feet from the station, the crosscut encountered a 5-foot ledge which shows high-grade milling values from wall to wall, while there is a 12-inch streak that assays $767 a ton. This rich streak carried large quantities of horn-silver and some free gold. — The Southwestern Nevada Mines company is running a drift on the 200-foot level which is opening up a big body of lead-silver ore, and the old mine is showing up well.—The leasers on the McGonagill Silver Bow Mining and Milling company's ground will resume operations within a few days. A new lease has just been let on the Chautauqua claim, under the terms of which operations will be commenced within a few days.

Washoe County.—It is reported that a railroad is to be built in the spring to the property of the Pacific Consolidated company near Pyramid lake, where the four groups of sixteen claims and four millsites have been lately patented.—On the ground of the Buckeye State company in this section a shaft is down 135 feet and a crosscut has opened up a forty-foot ledge running from $20 to $145 in gold and silver.

White Pine County.—Fred L. Schrott, superintendent of the Granite Mountain Mining and Development company, whose holdings are located near Dolly Varden, west of the Deep Creek country, has begun the sinking of a shaft in the center of the company's group of six claims on the hanging wall of a ledge fifty feet wide, from which galena running 39.77 per cent lead, and yellow carbonate containing $24.60 in gold, 21.2 ounces silver and 13.64 per cent lead to the ton have been obtained. The company will install a hoist and carry on development work through the winter.—As much as 300 feet of caved ground is above three men entombed in the 1,000-foot level of the Alpha shaft of the Giroux mine.—William D. Campbell has discovered on his ranch twenty-five miles northwest of Ely, an eight to twelve-foot ledge of ore running about $20 to the ton in gold.

MEXICO

Chihuahua.—The production of Parral for the week ending November 30th was was 7,650 tons, of which 3,950 were shipped to the smelters and 3,700 locally treated. —Ore running two and one-half kilos of silver is reported to have been encountered on the 400-foot level of the Refugio No. 2 in the Roncesvalles district.—One furnace of the new smelter put up by the American Smelting and Refining Company is expected to be blown in by the latter part of this month.—The Granadena Mining Company is mining and milling about eighty tons a day from the Mercedes mine, same giving over 14 tons of rich concentrates.—Ignacio Gallardo has struck 190 gram gold ore in his Maria mine.—Thos. Doherty and associates have resumed work on their Igualdad property near Granadena.—The Chinipas Copper Company, operated by Americans, is said to be developing one of the richest copper mines of the world in the Sierra Madre mountains on the extreme western edge of Chihuahua. The copper is almost entirely in native form, sacks full of the pure article being shown by miners lately arrived from the property.—L. M. Perry, representing a New York syndicate, of which he is a member, is pushing development work on the Inglaterra and Democracia mines in the Santa Eulalia district. On the former the shaft is down about 350 feet, and on the latter 700.

Durango.—On the Providencia mine in the Pueblo Nuevo district, mining machinery and reduction works are being installed.—It is reported that five tons of ore netting $10,000 have been recently shipped from the El Carbon mine near Canela.

Mexico.—The Metal Refining Company, which has been organized by French capitalists with a nominal capital of $800,000, Mexican money, has purchased the refinery of the National Metal company in Noncalco, on a spot cash basis. The latter company will continue as an ore purchaser. Ore bodies from two to three meters wide carrying from two to twenty-five kilos of gold and silver, have been encountered in the Carboncillo mine in the Zacualpan district. In one of these bodies the ore from the break without sorting will run fifteen kilos. The company at the present time is shipping about 150 tons per month of high grade ore to the smelter at Toluca. The Carboncillo company is also making some improvements at its mill, where it is putting in an additional fifteen stamps to be run by producer gas engines.—The Los Arcos Mining company in this district has shut down completely, and all work at their mines is at a standstill.—The Golcondo has also closed temporarily.—The Genovesa has struck a fair body of good shipping ore running five kilos or better and are shipping to Toluca.—At the Santa Ana mine of the El Reye Mining company in the Temoscaltepec a good ore body, running twelve kilos, has been struck. The ore is being shipped to Toluca.—The El Reye company is installing at Santa Ana mine an automatic overhead tramway from the mine to the mill, a distance of about three kilometers, by means of which it will haul its low grade ore to the mill. It is also engaged in installing an electric hoist and pumping plant at the mine.

Oaxaca.—The management of the Espinal mine has just received a big air compressor, which will be installed next week for the operation of the mechanical drillers. The mine is a good one, and situated in Sierra Juarez.

Quaretaro.—The Ajutchitlan Mining company is about to install an electrical plant on its property, which according to General Manager Clifton Crowell, will cost above $80,000 and will be the last of a series of improvements which have been carried on at the mines of the company for the last three years. The expense was partly covered by an issue of capital stock a few months ago which was all subscribed for by old stockholders.

Sonora.—Large numbers of laborers from the Cananea mines are seeking work in the southern part of the state without success, as construction on the extension of the Southern Pacific railroad has been stopped, and though agricultural laborers are in demand, the men do not seem adapted nor inclined to that kind of occupation.—Col. W. C. Greene says that work will be resumed at Cananea very soon, with great economies which will largely compensate for the lower price of the product. One feature is the introduction of oil in place of coal, through which a saving of forty per cent. of the fuel

Coal Mining and Its Branches

Those Interested in the Coal Industry in the Rocky Mountains are Requested to send Mines and Mining Reliable Information on all Subjects of Interest to the Coal Trade

Production of Coal in 1906

According to the statistics compiled for the United States Geological Survey by Edward W. Parker, coal mining expert in charge, the total production of coal in the United States in 1906 was 414,039,581 short tons of 2,000 pounds, valued at $512,610,744.

Production of Coal in 1906, by States

State.	Production.	Value
Alabama	13,107,663	$ 17,467,886
Arkansas	1,864,518	2,999,774
California and Alaska	30,831	78,684
Colorado	10,114,074	12,738,509
Georgia and North Carolina	363,463	407,247
Idaho and Nevada	6,165	24,238
Illinois	41,494,435	44,742,440
Indiana	12,084,281	13,105,168
Indian Territory	2,859,450	5,481,053
Iowa	7,321,639	11,688,598
Kansas	6,010,858	8,935,195
Kentucky	9,673,536	9,794,823
Maryland	5,434,528	6,473,829
Michigan	1,336,338	2,402,529
Missouri	3,755,778	6,163,449
Montana	1,787,934	3,186,620
New Mexico	1,963,558	2,635,571
North Dakota	300,998	437,894
Ohio	27,729,843	30,386,297
Oregon	79,731	212,338
Pennsylvania.		
Anthracite	71,282,411	131,917,694
Bituminous	129,263,673	130,265,241
Tennessee	6,262,686	7,682,121
Texas	1,160,707	2,058,731
Utah	1,773,847	2,411,992
Virginia	4,275,815	4,207,521
Washington	3,276,184	5,908,434
West Virginia	43,276,485	40,777,382
Wyoming	6,138,152	8,019,486
Total	414,039,581	$512,610,744

BRITISH FUEL TRADE.

For the first ten months this year Great Britain did an export trade in fuel to the value of £34,516,460 ($172,582,300), which is £8,152,471 ($40,762,355) more than in 1906. This growth has been due largely to the heavier shipments to France, Germany and Italy.

The exports in detail were as below in long tons of 2,240 pounds:

	1906.	1907.
Argentine Republic	1,997,321	1,760,202
Belgium	1,141,315	1,283,263
Brazil	935,906	1,065,850
Denmark	2,038,779	2,300,748
Egypt	2,196,903	2,361,221
France	7,719,927	8,770,524
Germany	6,286,832	8,329,296
Holland	1,793,757	3,331,719
Italy	6,714,772	6,928,748
Norway	1,219,969	1,328,366
Portugal, Azores, Maderia	844,966	936,462
Russia	2,692,422	2,624,637
Spain & Canaries	2,226,198	2,082,142
Sweden	3,020,886	2,977,486
United States	52,853	46,021
Other countries	5,488,654	6,687,864
Total coal	46,371,460	52,814,549
Coke	658,321	768,415
Briquets	1,152,632	1,233,226
Grand total	48,182,413	54,816,190

In addition to the above there were shipped for use on vessels engaged in the foreign trade, 15,539,691 tons of bunker coal, as against 15,576,014 tons in 1906; a decrease of 36,323 tons.

DEEP COAL BORE HOLE.

A bore hole which is being sunk on a field near Cameronbridge, Glasgow, has reached the depth of 4,536 feet before the mountain limestone was reached. Another deep bore is that at Gilmerton for Messrs. William Baird & Co., coal masters. Gartsherrie, which reached a depth of about 3,000 feet. The bore, which measured 8 inches at the surface, tapering to 1¾ inches at the bottom, has been the means of proving the existence of the lower coal measures in the east of Fife. Great interest has been taken in the operations by the Scottish Geological Survey, who propose to test and to record the temperature at the bottom of the bore.—London Times, Engineering Supplement.

In the United States the consumption of metallic bismuth is largely satisfied by imports free of duty. Small quantities of bismuth salts for chemical and pharmaceutical purposes have also been imported. It is a fact worthy of note that the import trade has grown over fifty per cent. in the last ten years, while the bismuth mining industry in this country has shown comparatively little progress. This is not because there is a scarcity of bismuth-bearing deposits in the United States, for they have been found in Colorado, California, Nevada, Arizona and Utah; but it is rather the result of inadequate methods of smelting the metal here. The refined bismuth imported from Great Britain and Germany frequently analyzes over ninety-six per cent. in purity while crude metal will be ninety-three to ninety-six per cent., having as impurities antimony and arsenic or other metals.

Few mineral substances are so largely distributed throughout nature as arsenic, in spite of which fact arsenic mines worked with profit are relatively few. The countries possessing the best mines of arsenic are: Germany, England, Austria, France, Italy, Spain, Portugal, Norway, Siberia, New Zealand, Chile, Mexico, Canada, and the United States. Among the most important sources of arsenic may be mentioned the following: The silver mines of Saxony, Germany, those of tin and pyrites of England, arsenico-pyrites or mispickel of Spain, and auriferous mispickel in the Province of Ontario, Canada. Metallic arsenic associated with antimony, silver, and other minerals is occasionally found.

SIZINGS

The original type of Blake crusher was patented in 1858.

A mile of track (rails sixteen pounds to the yard) weighs 50,320 pounds.

The life of a railroad tie averages from five to nine years. The poorest wood is spruce pine, the best, cedar.

India's gold production is greater than commonly supposed. The average annual value of her gold is about $12,000,000.

Tantalum is used in the manufacture of very fine wire for use in the construction of the tantalum. This, as far as known, is its only commercial use.

As little framing of mine timbers as possible, is done in Leadville, owing to the settling of the ground, which requires their renewal every few months.

The longest tunnel in the world was completed a short time ago. It is the Simplon tunnel between Switzerland and Italy and is 12.4 miles in length.

The production of tungsten in the United States for the year 1906 was 1,096 tons with a total value of $443,150. About eighty per cent. of this came from Boulder county, Colorado.

The average percentage of copper in blast furnace matte is between fifty and sixty per cent., while the percentage in reverberatory furnace matte runs from forty to forty-five in good smelter practice.

Although compressed air traction engines are the present motive power at the Washoe smelter it is understood that electric power is better suited to the conditions, and that a change will be made.

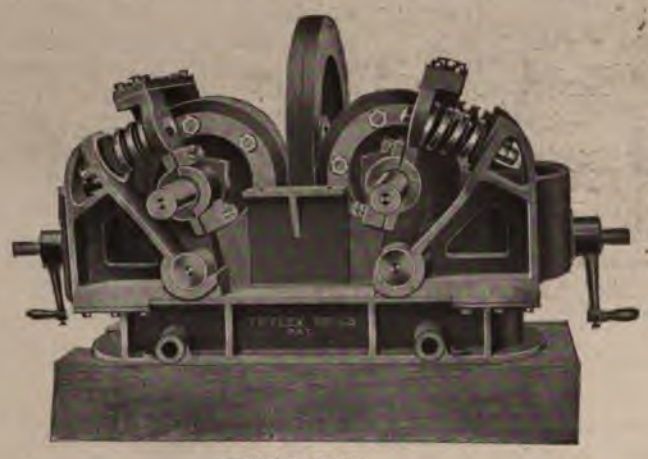
MACHINERY AND EQUIPMENT

Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.

THE ELSPASS ENGINEERING & MINING MACHINERY CO.

The Elspass company, best known as owners and distributors of the Elspass mill, have within the past two years brought out the Samson crusher, and about a year ago the Elspass Triplex rolls were introduced. Of these three the Elspass quartz mill is more widely used, owing to the time it has been on the market; however, a word as to the principle of the mill will not be out of place. A concise description as well as a valuable testimonial is given in the following annual report of the director of mints, Washington, D. C., on the work of the Elspass in the United Staes mint at Denver: "The Elspass mill consists essentially of a heavy revolving bed or pan, upon which rests four stationary rolls. These rolls press upon the die ring or pan to any degree of pressure required, regulated by powerful coiled springs. Around the circumference of the pan is a rim, in which is placed screens of any desired mesh, that are quickly and easily changed when necessary, the screen having twenty-two feet of free surface, and is attracted to and moves with the revolving pan. * * * This mill is capable of reducing a greater variety of materials than stamps, rolls, or Chilian mills, * * * and eighty to eighty-five per cent. of the free gold is recovered in the bed of the mill without the use of mercury, and when mercury is used in the pan within which the rolls rest as high as ninety-five per cent. of the values have been saved."

The Samson crusher has for its characteristic features, claim to a uniform size in its crushed product, and the small horse-power required to operate it. It differs from other crushers in its simplicity of construction, and is made in sectionalized form for mule-back transportation. The Triplex rolls are a brand new departure in a solution to the problem of keeping a true and even grinding face on the rolls. To this end a third and larger roll has been placed between and at right angles to the two rolls as ordinarily used, and thus by means of this idler roll two grinding surfaces are obtained as well as true grinding faces. So far this triplex roll has stood the tests to which it has been subjected, and in the future should become an important factor in mill work.



Triplex Rolls.

THE BUSTER QUICK CEMENT AND ORE CRUSHER.

This machine is a new invention fully patented in the United States and applications for patents made in foreign countries. It is the invention of Mr. Harry C. Quick, of Los Angeles, California, and a close corporation known as the Buster Quick Mill Company of the same city own the patent. The device is a simple affair, but if it does all that is claimed for it, it is destined to revolutionize rock crushing. It is not a large machine, barrel like in shape, filled with triaugular teeth of case hardened tool steel, each one separate and distinct from the other. The barrel (so-called) is surrounded with iron staves each about a half inch apart. The rock goes in at a hopper on the top at one side, drops to the bottom and is caught by the teeth, which are revolving at a high rate of speed. The centrifugal motion at once elevates the rock and throws it in violent contact with itself and crushes it to powder. The motion of the little gaint like machine then throws the crushed rock out from the interstices of the staves through screens attached thereto, the same as water is thrown outward from a swiftly revolving grind stone. There is little or no friction on the machine or any of its mechanism, as the pieces of rock or other substance are crushed by coming in violent contact with each other. It is a wonderful invention and at a recent trial of a model eleven and three-fourths inches high and twelve inches in diameter, rock, glass bottles, river boulders, pieces of granite, scrap iron, wheat, corn, wet putty and many other things were thrown into the hopper and in less than a minute the produced conglomerate was thrown through the 120-mesh screens in a dry powder. This same little machine can "eat up" from twelve to fourteen tons of the hardest rock in a day. Larger machines will soon be manufactured in Denver, Salt Lake City, Los Angeles and other places. Power of any kind can be used. The company controlling the patent have a fortune-making invention and already many orders have been taken, for the machine is attracting much attention, especially among mining and cement men. The claim is made that the machine will do the work of a ten-stamp mill and cost less than the price of one stamp, and weigh less than a thousand pounds. No foundation is required. It is dust proof, easily handled, and perfectly safe. It can be used wet or dry, and will do the work of a ten-stamp mill at comparatively small cost. It can be used in the bottom of a mine, on the surface or elsewhere. It can be packed on burros and conveyed to any place where it is intended to be used. In a few hours it can be set up and ready for use. It is durable and will revolutionize mining and prove a blessing and a money-maker to mining men.

H. C. Quick, the inventor, is a young man and president of the company; E. J. Phelan, a hardheaded business man, is vice president, and J. E. Ward, for-

merly in the banking business at Modesto, California, is the secretary and treasurer. Mr. Quick is modest, keen-eyed and bright as a new dollar. While he does not claim to be the only pebble on the beach, he does claim and is entitled to the credit of solving the problem of rock crushing in a scientific, and economic manner.

ELATERITE ROOFING.

Elaterite roofing is largely used in construction of buildings in the mining and milling industry, and a word of information about it should be most acceptable to the men interested in such matters. This roofing is unique in some respects compared with similar products, being constructed with a thick coating of Elaterite roofing cement as a base, reinforced with burlap and backed with a saturated wool-felt, surfaced with mica. Such construction renders it extremely elastic, pliable and durable, together with strength permitting of expansion and contraction without injury.

The cement used shows a quality of wonderful resistance to the elements, withstanding an extremely high heat or low temperature equally well. The mica surface prevents the adhesion of the surface when put up in rolls, and also reflects the heat of the sun, thus keeping a building cool and comfortable, and doing away with the unpleasant warmth produced by iron or metal roofs. Its resistance to wind, moisture and cold also make it an ideal winter roofing or wall covering.

This roofing contains no coal tar or pitch, the Elaterite roofing cement being a mineral rubber made of hydrocarbons. It is water, steam, acid, rust and wind proof as well as fire proof. When a live coal of fire is placed upon a piece of the roofing it will partially sink into the material but will not ignite it, and soon dies out. For all practical purposes Elaterite roofing is classed as fire proof and secures the same insurance rates as metal roofs.

The convenience in handling and ease of laying is one great point in favor of this product. It is done up in rolls, thirty-two inches wide and forty feet long, giving 107 square feet, which allows for a two-inch lap in covering a surface of 100 square feet. It can be put on by any ordinary mechanic.

Elaterite roofing is manufactured by the Western Elaterite Roofing Company, a Colorado corporation, operating in Denver. Their product was first put on the market some twelve years ago, during which time constant improvements have been added to their plant and its product, until today the plant is one of the most efficient in the country. Some idea of the growth of the business may be gained from the accompanying cut of the plant. The company markets its goods principally west of the Missouri river, including all the territory north and south to the Pacific coast.

In addition to Elaterite roofing, which is made in various weights to suit different conditions, this same company manufactures several grades of paints, namely, No. 20 Elaterite paint, No. 14 Elaterite paint and "Werco" liquid cement. The first mentioned is adapted for coatings of cyanide tanks, etc., the second is used extensively for general iron work, while the "Werco" is especially prepared for coating reservoirs, waterproofing foundations, and coating prepared roofing of all kinds.

The Elaterite company have made a close study of this line of business, and the satisfaction they are giving throughout the West is a sincere testimony of their success.

Plant of the Western Elaterite Roofing Company, Denver, Colorado.

MINNESOTA MINERAL LAND TAXES.

The rates of valuation per ton of iron ore in the ground are as below:

1. Operating Mines—Class 1, (a) 50 cents, (b) 45 cents. Class 2, 40 cents. Class 3, 30 cents. Class 4, 25 cents. Class 5, 20 cents.

2. Prospects—Class 1, 15 cents. Class 2, 13 cents. Class 3, 10 cents. Class 4, $5 to $10 per acre.

The factors taken into consideration in the determination of the valuation of mining properties are as follows: (1) Geological conditions; (2) difficulty of mining; (3) character of the ore; (4) character of mining rights.

Mining properties are divided into two grand groups; operating mines and prospects.

For the purpose of determining the valuation of operating mines the following groups are suggested.

Class 1. (a) Properties in which mining is comparatively inexpensive, and the ore of high grade; (b) properties where mining is comparatively inexpensive and the ore of lower grade.

Class 2. Properties where mining is somewhat more difficult and mining cost greater than in the case of Class 1, and the ore of mixed grades.

Class 3. Underground properties where the expense of mining is comparatively low, for that kind of mining, and the ore of high grade.

Class 4. Underground or milling pit properties of distinctly second grade, determined by a higher cost of mining and lower grade of ore than in the case of Class 3.

Class 5. Mines of inferior character where expenses of operation are high.

Prospects may be classed under four groups, as follows:

Class 1. Lands that have been drilled and test-pitted, and where stripping of the overburden has been carried on—in other words, where the property is about to become a mine.

Class 2. Lands that have been drilled and test-pitted and ore found in some abundance.

Class 3. Unexplored lands near good mining properties.

Class 4. Lands that have not been explored, but are in the well known ore belt.

THE STOCK AND METAL MARKETS

Colorado Springs

Dec. 19.—Following are the quotations at the close of the exchange today:

Stock.	Bid.
Acacia	05½
Black Bell	02
C. C. Cons.	03⅜
C. K. & N.	05
Dante	5¼
Dr.-Jack Pot	05¾
Elkton	45
El Paso	27½
Fanny Raw	06
Gold Sovereign	04
Gold Dollar	05¾
Index	02
Isabella	23¾
Jack Pot	03½
Lexington	01¼
Mary Cashen	....
M. McKinney	31
Mollie Gibson	....
M'n Anchor	01¾
Old Gold	02¾
Pharamacist	02½
Portland	95
Prince Albert	....
Vindicator	75
Work	12

Unlisted.

Stock.	Bid.
Golden Cycle	40
Jennie Sample	....
Jerry Johnson	05
Un. Gold Mines	04½

Prospects.

Stock.	Bid.
Agnes	....
Alamo	....
Aolo	007
Banner	01⅛
Blue Bell	02
Bob Lee	005
Buckhorn	0075
Des Moines	....
Gold Bond	....
Gould	....
Hart	....
Ida May	01
Jolly Jane	007
Keystone	01
Little Bessie	....
Little Nell	01
Little Puck	01
Mary Nevin	01¾
Missouri	005
Mtn. Beauty	05
National	0075
New Haven	005
Pilgrim Cons	01
Raven & B. H.	0095
Republic	008
Requa Savage	02¼
Robert Burns	....
Rose Maud	01⅝
Rose Nicol	01
St. Thomas	01
Teutonic	01¾

Miscellaneous.

Flower of West	0055
Hummer	004
Mariposa	003
Texas Girl	004

New York

Dec. 19.—It seems to be the opinion of a great many steel men that it is foolish to force a too quick resumption of mills and furnaces, as they think it is best to await business assuming normal conditions. Of course great preparation is going on to handle the vast business in steel that must come in the spring, and it is the consensus of opinion that March will be one of the busiest months in the building line in many years. This is the natural outcome of the present slump. Steel manufacturers are taking a much earned rest after an extraordinary period of prosperity. It is figured by certain steel men that the steel mills will produce on an average of sixty-five per cent. of their normal capacity next year.

The general situation is impriving each day, and while not as good as it should be, yet signs point to a gradual resumption of normal conditions.

Following are the quotations:

Stocks.	Close.
Amalgamated Copper	43¼
American Smelting	69⅞
American Smelter pfd.	90
Colo. Fuel & Iron	14
Anaconda Copper	27
Republic Steel	16½
National Lead	38½
U. S. Steel	25⅝
U. S. Steel pfd.	86⅞
General Electric	114
Utah Copper	15½

Following are the quotations:

*Stock.	Bid.
Arizona Commercial	13¾
Ahmeek	45
Black Mountain	4⅛
Cumberland Ely	5⅝
Davis-Daly	3⅛
Ely Cons. Copper	½
East Butte	4
Furnace Creek	....
Giroux	2½
Greene-Cananea Copper	5⅞
Globe Cons. Copper	6
Keweenaw	5
Mitchell	55
Nevada Utah	2⅜
Nevada Cons.	7¼
Superior & Pittsburg	8⅝
Tintic	2⅝
Utah Apex	2½
B. & L.	80
Majestic	1
Carisa	18

*Otis & Hough.

Boston

Dec. 19.—There is another side to the proposed closing down of the Washoe smelter beyond the mere fact that it will lead to a possible further curtailment of output, and a suspension of net earnings of Anaconda, Butte Coalition, North Butte and any other companies which may be dependent upon the Washoe smelter for the treatment of their ore.

It is known that the Western Federation of Miners has for many years been extremely autocratic in the Butte camp. There are those who believe that the closing down of the Washoe smelter and the exodus of thousands of miners from that camp will enable the copper interests in that district hereafter to adhere to the "open shop" policy.

Furthermore a complete shutdown in Butte will bring the farmers who are dependent for the sale of their product upon the prosperity of the mining interests to a realizing sense of the hardships which will be endured in case they force action, through the court, looking to a complete abatement of the so-called smelter fume nuisance.

At great expense the Amalgamated people have already reduced to a minimum the emission of sulphur fumes, etc., arising from the treatment of sulphurous ores in the Washoe smelter.

A careful observer says. "While I do not care to reflect upon the sincerity of the motives leading to the drastic orders which have been issued regarding mining operations in Butte, I cannot but feel that there is a very significant willingness on the part of the Amalgamated people to enlarge upon the unfavorable conditions in the copper industry, especially so far as it relates to their Butte properties.

"Of course, it goes without saying, that none of the Butte mines, with the possible exception of North Butte and Boston & Montana, can make a new dollar for an old one, operating at less than half capacity with copper selling at 13½ cents and under. Nevertheless, why should the Amalgamated people feel themselves called upon by further restriction of output to facilitate the sale of such copper as can be produced at 10 cents per pound and under? This good Samaritan act is, to my mind, very significant.

"The present situation naturally emphasizes the need of smelting plants by the Butte Coalition and North Butte companies. I believe that North Butte could today operate at a very substantial profit provided, of course, they could have their ore smelted at the Washoe plant, and if North Butte has a smelting contract with Amalgamated it must be a strange sort of document which permits the entire cessation of smelting at the will of the Amalgamated people.

"I have seen no evidence that the Amalgamated people were securing a large ownership in the Butte mines, but they now have the opportunity of a lifetime if they are so disposed, to secure at rock bottom prices a large if not a dominating, interest in Butte Coalition and North Butte. It would seem also that, with Anaconda at $28 per share the Amalgamated people would be very short-sighted if they did not still further increase their ownership in that property.

"The normal output of the Butte camp may be placed at 25,000,000 pounds per month, or 300,000,000 pounds per annum. If only the Boston & Mon-

tana is to be kept in operation, together with the restricted output of William A. Clark's plant, it will mean that the Butte copper district is to put on the market a little in excess of 100,000,000 pounds per annum, or a loss from normal operations of 200,000,000 pounds per annum, which is a little more than 20 per cent of the whole United States production.

"It would seem as though the Amalgamated were needlessly sacrificing their own profits to the benefit of their competitors when they are apparently so willing to bear almost the entire burden incident to a lessened output but on the other hand, it may be merely the operation of natural economic laws which decree that on a 13@13½-cent copper market only those mines can live which can land their copper in New York at a cost under this figure."

Following are the quotations:

*Stocks.	Bid.
Adventure	3
Arcadian	3¾
Allouez	25½
Atlantic	3¾
Bingham	41/8
Boston Con	10
Balakala	2¼
Butte Coalition	13¾
Calumet & Hecla	590
Calumet & Arizona	94
Centennial	23¾
Copper Range	54
Daly-West	31½
Franklin	7
Granby	70
Isle Royale	17
La Salle	10
Mass	2½
Michigan	8
Mohawk	43
North Butte	39¼
Old Dominion	27¼
Osceola	80
Parrot	9
Quincy	75
Shannon	9¼
Tamarack	63
Trinity	14¼
United Copper	7½
U. S. Smelting	32¼
U. S. Smelting prf	35½
Utah Cons	29⅞
Victoria	4¼
Winona	4
Wyandot	60
Wolverine	108

*Otis & Hough.

San Francisco

San Francisco, Cal., Dec. 19.—Follow- were the closing quotations on mining stocks today:

Comstock.

Stock.	Bid.
(Furnished over the private wire of O. L. Malo & Co., 221-223 Boston Bldg., Denver, Colo.)	
Ophir	1.12½
Mexican	....
Gould & Curry	12
Cons. Virginia	25
Savage	34
Hale & Norcross	35
Yellow Jacket	1.70
Belcher	17
Confidence	58
Sierra Nevada	37
Exchequer	....
Union	26

Tonopah.

Stock.	Bid.
Tonopah of Nevada	5.25
Montana Tonopah	1.70
Tonopah Extension	1.50
MacNamara	16
Midway	50
Tonopah Belmont	90
Tonopah North Star	09
Ohio Tonopah	02
West End Cons	....
Rescue	....
Tonopah & California	02
Golden Anchor	....
Jim Butler	41
Cash Boy	....
Monarch Pittsburg Ext	01
Montana Midway Ext	01
Golden Crown	03

Goldfield.

Stock.	Bid.
Sandstorm	22
Red Top	2.00
Columbia Mountain	20
Jumbo Extension	60
Vernal	06
Pennsylvania	....
Kendall	12
Booth	21
Blue Bull	20
Adams	07
Silver Pick	31
Nevada Boy	03
Black Butte Ext	03
Blue Bell	08
Dixie	06
Goldfield Columbia	11
Hibernia	02
St. Ives	51
Conqueror	06
Black Rock	02
Lone Star	10
Goldfield Wonder	....
Potlatch	....
Oro	10
Kendall Extension	....
Sandstorm Extension	....
Mayne	02
Atlanta	32
Great Bend	33
Simmerone	03
Empire	04
Red Top Extension	15
Florence	4.35
Diamondfield B. B. Cons	18
Goldfield Daisy	1.07½
Combination Fraction	32
Great Bend Extension	06
Great Bend Annex	04
Milltown	....
Black Butte Bonanza	03
Kewanos	26
Esmeralda	04
Portland	07
Crackerjack	07
Frances Mohawk	....
Red Hills	37
Mohawk Extension	04
Lou Dillon	04
Yellow Tiger	10
Grandma	07
Silver Pick Extension	02
Yellow Rose	....
Columbia Mountain Ext	....
Goldfield Cons	4.95
Diamondfield Triangle	08
Coming Nation	02

Bullfrog.

Stock.	Bid.
Original	03
Bullfrog Mining	05
Montana Bullfrog	01
National Bank	10
Lige Harris	....
Amethyst	09
Gold Bar	40
Steinway	....
Denver Bullfrog Annex	03
Bonnie Clare	10
Mayflower Cons	15
Montgomery-Shoshone Ext	02
Golden Sceptre	03
Montgomery Mountain	....
Bullfrog Diamondfield	03
Homestake Cons	75
Yankee Girl	01
Nugget	....
Tramp Cons	19
Victor	02

Manhattan

Manhattan Cons	20
Manhattan M. Co	....
Gold Wedge	03
Sevler-Humphrey	02
Dexter	05
Little Joe	....
Crescent	....
Combination	....
Mustang	10
Cowboy	01
Original Manhattan	....
Broncho	02
Jumping Jack	05
Pinenut	03
Stray Dog	10
Yellow Horse	02
Indian Camp	04

Other Districts.

Fairview Silver King	....
Fairview Eagle	....
Nevada Hills	3.05
North Star Wonder	....
Eagle's Nest	22
Alice of Wonder	....

Salt Lake City

*Dec. 19.—Following were the closing quotations on mining stocks today:

Stock.	Bid.
Alice	....
Ajax	20
Butler-Liberal	....
Bullion Beck	76
Beck Tunnel	47
Black Jack	22
Colorado	2.02½
Carisa	20
Columbus Cons	1.00
Cons. Mercur	18½
Daly Mining	....
Daly-West	8.00
Daly-Judge	3.50
Eagle and Blue Bell	1.00
Grand Central	2.50
Ingot	....
Lower Mammoth	44
Little Bell	1.15
Little Chief	3.50
May Day	29
Mason Valley	80
New York	01
Mountain Lake	25
Ontario	....
Ohio Copper	2.25
Nevada Hills	2.75
Standard Copper	14
Sacramento	....
Silver King	3.12½
Silver Shield	03
South Swansea	....
Swansea	....
South Columbia Cons	47
Tetro	1.00
Thompson	....
Uncle Sam	....
Victoria	....
Victor	04½
Wabash	05
Yankee	25
Iron Blossom	20
Sioux Blossom	13½
Crown Point	11½
Seven Troughs	29

*Otis & Hough.

Denver

Dec. 19.—Following were the closing quotations and sales on mining stocks today:

Mines.

Acacia	05¼
C. C. Cons	03¼
Dante	05¼
El Paso	27½
Gold Sovereign	03⅜
Gold Dollar	05¾
Lexington	01¼
Old Gold	02⅞
Pharmacist	02¾
Isabella	23
Jennie S	02
Jerry Johnson	05¼
Work	12¼
Un. Gold Mines	04½

Prospects.

Teutonic	01⅝
Rose Maud	01½

METALS.

St. Louis, Dec. 19.—Lead dull, $3.50. Spelter dull, $4.00.

New York, Dec. 19.—Lead—Quiet; $3.35@$3.45.

Lake Copper—Quiet; $13@$13.25.

Silver, 53c.

A line of sights along the outcrop of a vein does not always give the true strike. This is the case when the vein has a decided dip and a steep topography, for the erosion exposes the ledge at different depths, while a true strike would be a line obtained from points all on the same level, which can be obtained approximately by observations of dip, strike, etc., of the ledge.

Corporation Affairs and Finances

DENVER & RIO GRANDE.

Denver & Rio Grande's report for October and four months ended Oct. 31st, compares as follows:

	1907.	1906.
Oct. gross	$2,098,195	$1,877,006
Ex. & tax	1,449,546	1,152,856
Oct. net	$ 648,649	$ 724,150
Other inc	8,824	13,370
Total inc	$ 657,473	$ 737,520
Chgs, etc	324,833	297,013
Surplus.	$ 332,640	$ 440,507
Renew fd	10,000	10,000
Oct. sur	$ 322,640	$ 430,507
4 mo. gross	8,305,115	7,094,441
Exp. & tax	5,524,418	4,482,928
4 mo. net	$2,780,697	$2,611,513
Other inc.	116,884	139,502
Total inc	$2,897,581	$2,751,015
Charges, etc	1,287,743	1,168,311
Surplus.	$1,609,838	$1,582,704
Renewal fd	40,000	40,000
4 mo surp	$1,569,838	$1,542,704

AMERICAN STEEL FOUNDRIES.

The American Steel Foundries and subsidiary companies report for the quarter ended Oct. 31, 1907, as follows:

Net earnings, etc	$657,533
Miscellaneous income	11,531
Total	$669,064
Deductions:	
Interest on bonds	$ 58,075
Sinking fund on bonds	26,250
Depreciation.	55,750
Total deduction.	$140,075
Net income.	$528,989

The directors at their meeting decided hereafter to issue quarterly statements.

The average matte charge of the ordinary common converter is about nine tons. The average time of blow is about three hours, but varies according to the temperature of the matte at the time of charging.

California, Kern County

(Special Correspondence.)

Once in a while you will run across a mining proposition that is first class and that don't make much noise. Such an outfit is the Pacific Mining Company located in Kern county, California, one mile south of Randsburg. The concern owns only three claims adjoining and near to the Santa Ana, Winnie, Papoose, Yellow Aster and other big concerns. The proposition is gold and tungsten (schelite). Its gold average is about $70 per ton and the tungsten fifty-eight per cent. The veins are from eighteen to thirty inches in width and considerable work has been done. Four shafts are down on the property in ore all the way from forty to 170 feet. All the ore taken out thus far has been milled at the mill on the Sunshine plant. The mine has been worked off and on for the past six years and more than $250,000 in gold taken out. Two of the claims came into the hands of the present owners about three years ago and the third one about four months ago. The tungsten is sent to New York and from thence to Swansea, Germany. There is considerable of this last named metal in the mine, and the unusual demand for it makes it very valuable. The Randsburg district is one of the best known tungsten districts in the country. The gold and tungsten run together.

The concern is incorporated for the modest sum of $100,000 in dollar shares. J. C. Balschweid is president; Dr. H. B. Farig, vice president, and Mrs. F. F. Ash, a pleasant faced little lady, secretary. The depository of the concern is the Broadway Bank and Investment Company of Los Angeles.

This property, properly worked, will yield a mint of money to its owners and prove a safe investment to capital. It is about 100 miles as the crow flies north of Los Angeles.

One Capable Salesman

At $200 per month will sell more mining machinery than four indifferent salesmen at $50 per month. It's the same with advertising mediums. Two hundred dollars' worth of space in MINES AND MINING will sell more mining machinery than four $50 ads placed in the cheap papers. You don't hire salesmen because they're cheap, and you should not buy space in a paper because it's cheap. Both are generally dear at any price. Write for advertising rates.

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MINES AND MINING

FOURTEENTH YEAR WEEKLY

Vol. 15 1824 CURTIS STREET, DENVER, COLO. No. 13

Scientific American Ex
361 Broadway

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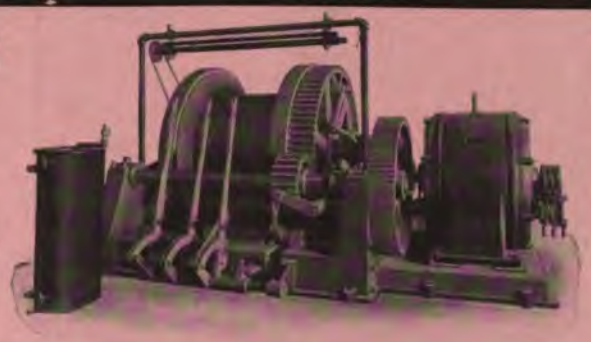

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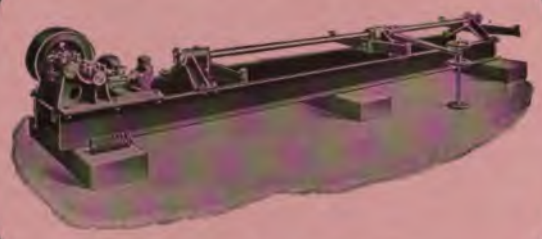

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MINES AND MINING

WEEKLY

Vol. XV | Denver, Colorado, December 27, 1907 | No. 13

MINES AND MINING

A. J. CASEY.....Manager
C. L. HALL.....Editor

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We will be pleased to publish any correspondence relating to mining, milling, metallurgy and kindred subjects, or sharp, clear photographic sketches pertaining to improved machinery, new inventions, mines, mills, smelters, or of any other branch of the mining industry. As a matter of protection and good faith, name and address must accompany such communication.

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Sub-treasury for Denver

In all probability a subtreasury will soon be located in Denver. The bill has already been introduced in the lower house by Congressman Bonynge and if not too strongly opposed by the banking power, will most likely pass, if not this session, the one immediately to follow. The bill provides a salary of $4,500 a year for the assistant treasurer, and for assistants, rentals and other contingents, $25,000 additional.

Several of the banks of Denver are now government depositories and the subtreasury would take away all of these deposits. The banks act as the disbursing agents of all the government officers and each year a large amount of government money goes through their hands.

The reason for taking up the matter was because there is no subtreasury between St. Louis and San Francisco and there is a vast region in the Rocky Mountains to benefit by the location of the subtreasury. All of the money coined at the mint would be looked after by subtreasury officials and the Denver and other banks of this region would be able to secure money easier and in a shorter time on the presentation of the proper securities.

All government warrants will be paid by the subtreasury, also pension checks. Subtreasuries are now located at Boston, Philadelphia, New York, Baltimore, New Orleans, St. Louis, Chicago and San Francisco.

In Chicago the subtreasury is in the federal building and when the new building goes up in Denver it will likely be provided with facilities for the subtreasury to save the $25,000 rent for quarters which will have to be paid until it is located in the federal building.

So the government is beginning to pay some attention to Denver. Uncle Sam has discovered that there is such a place on the map.

Quiet at Goldfield

No progress toward a settlement has been made at Goldfield, and from the action of the mine owners in filing their suit in the United States Court it promises to be a fight of extermination.

The President's action in placing the troops in Goldfield was undoubtedly a wise move for all concerned, but the wisdom of his order for removal on December 30th is debatable. His stand that the state should deal with the situation is right, and Nevada should by this time have been able to cope with the conditions of affairs, but notwithstanding all this, better order will be preserved by retaining the federal troops and awaiting the action of the state, than by leaving the enforcement of law and order to local "rangers."

The only difference between the Cripple Creek trouble and the present Goldfield affair appears to be the fact that military force was resorted to in Nevada soon enough to prevent much violence on either side, and the President should not risk a repetition of the former unfortunate lawlessness.

The bill filed in the courts is brought by the Goldfield Consolidated Mines Company, with the officers of the local union as defendants. The Goldfield union is charged with "intimidation," "wanton destruction of property, murder of innocent citizens, lawlessness and anarchy to such an extent that it has instituted a reign of terror in the Goldfield district." Finally the court is asked to issue injunctions restraining the union from interfering with the business of the Consolidated Mines Company in any way and also petitioned to prevent meetings of and dissolve the Goldfield union. The complaint is signed by the vice-president of the Consolidated, George Wingfield.

The effect of this suit will probably be to induce the President to hold the troops in Goldfield, or at least a portion of them, and was filed with this end in view.

Acting President Mahoney of the Western Federation has made the statement that the organization intends to stand by the local union in all it has done and in all its future actions, which means the complete abolishment of the W. F. of M. in Goldfield or the defeat of the mine owners. From the present point of view, the most logical solution would be the enforcement of law and order, which would allow the importation of non-union men and a resumption of mining operations. It is said that a strike is caused by one of two classes, an un-

derpaid or an overpaid workman, and in this case it is clear that the Goldfield miners were given too much of a good thing, making them dictatorial, and that as soon as they can appreciate a good job at fair wages they will come to terms.

The only mining activity in the camp is at the Mohawk, where about fifty men are at work. However, several mills are running, and all are closely guarded.

The Cripple Creek Deep Tunnel

Reports from Colorado Springs state that specifications for the construction of the Cripple Creek deep drainage tunnel and for the sinking of the intervening shaft have been announced. Bids are to be called for without delay and will be received until January 15th.

The requirements call for 750 feet of construction every three months until the intermediate shaft is completed to the tunnel level, after which the rate will be increased to 1,500 feet. The shaft is to be sunk 200 feet every three months, and as the depth is now ninety feet, it will reach the tunnel level in nine months. According to these figures the 15,550 feet of the tunnel will be completely bored before January 1, 1911.

A forfeiture clause is included, by which the company holds back fifteen per cent, until 5,000 feet shall have been bored, and after that ten per cent.

It begins to appear as if the much-talked of great bore would yet become a genuine reality. This is about the tenth year since it began to be discussed, and it is cheering to believe that by this time there is something behind it besides talk. It will prove the salvation of the great gold camp and should be pushed to completion as rapidly as possible.

A Great Low-Grade Proposition

It is not generally known that King Oscar of Sweden, who died a few days ago, was heavily interested in mining properties in this country. Himself, including several of his countrymen who reside in Los Angeles, owned the Quartz King mine near Parker on the Colorado river, and near the present terminus of the new Arizona and California railroad, now building from Wickenburg, Arizona, to Amboy, California, where it will connect with the main line of the Santa Fe.

The Quartz King mine is owned principally by Swedish capitalists, and King Oscar is said to have been a heavy stockholder. The property is considered a low grade gold proposition with an abundance of excellent copper ore. Thousands of dollars have been spent on the property in recent years and it is said that the building of one of the largest stamp mills in the world is one of the projects of the shareholders.

The death of King Oscar will not delay operations on the property, as his former associates are able to go on with the further work of developing and equipping the property. As a great low grade gold and copper proposition, it is considered one of the best in the country. Capital is now being raised for equipping it with a mill of 1,200 stamps.

The Railroads Economizing

It was announced about the middle of the month that in January the railroad companies would lay off 11,000 or 12,000 men for an indefinite period. As if by concerted action come reports from the following roads that owing to heavy decreases in traffic it will be necessary to curtail expenses correspondingly.

Among the roads that have so signified are the Frisco, Rock Island, Southern Pacific lines, Texas & Pacific, Cotton Belt, Santa Fe, Houston — Texas Central, International and Great Northern, the Katy, Fort Worth & Denver, and others.

These reductions will affect every branch of railroading from watchmen to operating forces. While the officials say they believe the dull season will last but a few months, the cut in forces will mean a saving of more than $700,000 a month in the payrolls.

The Production of Copper Further Curtailed

For October there was a decrease in the production of copper, compared with the same period of last year, of 28.9 per cent. The production for October, 1906, was 28,893,240 pounds, while October, 1907, showed a decrease of 8,376,200 pounds. The November and December Statements will probably show a corresponding falling off.

The following table indicates the comparative drop in production:

	1907	1906
First 6 mo.	154,447,612	182,845,430
July	27,157,395	32,376,970
August	23,127,240	34,057,034
September	11,329,800	29,456,520
October	8,367,200	28,893,240

Copper exports during October, 1907 were, according to the New York Metal Exchange, 20,786 long tons, the largest export of any one month since November, 1906, which amounted to 23,914 tons.

The following table shows the comparative exports from the United States, including all of last year and the ten months of this year:

	1907	1906
Jan.	17,039	15,307
Feb.	9,174	15,801
Mar	13,432	16,013
Apr.	17,363	15,350
May	9,010	18,660
June	16,193	17,103
July	14,774	18,309
Aug.	13,458	20,020
Sept	17,157	13,519
Oct.	20,786	16,419
Nov.		23,914
Dec		14,023
12 months		204,628

Reports from New York represent that conditions in the copper market have recently undergone a gratifying improvement, and the events of the last few days have resulted in stimulating the greatest buying movement witnessed for months. When prices declined to 12 cents, and a little below that figure, the rock bottom of the market was reached. A sudden rebound occurred on the 24th of October from the 12¼ cent level when orders poured in upon sellers in heavy volume, and since that date enormous quantities of metal have been disposed of at sharp advances from 12¼ to 15 cents per pound.

The surplus stocks are quite well exhausted and with the enormous decrease in production and demand active copper will certainly go to 17 or 18 cents in the next sixty or ninety days.

The contracting and leasing system is becoming more widely used every year. Where the conditions are suitable this should be done, as the men work with better spirit and the company can do its work cheaper.

The Brandt drill, used on the Simplon tunnel, is made in Europe. It is operated by water under a high head of pressure, which forces the bit against the face while it slowly turns, cutting away the rock.

In a small cyanide plant where the cost of agitation is prohibitive and where the tailings are too fine to allow proper percolation, the method of filling the tank only half full has been used to overcome the difficulty.

Iceland spar is a very pure, colorless variety of calcite. Owing to its optical properties and its rarity, it is very valuable. Iceland is the only place where it is found in commercial quantities, hence the name.

Lower California

By E. A. HAYES, Staff Correspondent Mines and Mining

This part of God's earth has been known in spots for a long time to those who seek gold and silver. A glance at a map does not convey ideas of magnitude yet Lower California is larger than it seems and in addition to its history it possesses a large number of mines of gold, silver, copper and lead. The northern part of the peninsula in places is heavily timbered and springs hot and cold abound. The population in the main is Mexican if descendants from the Astecs, Indians, negroes, Spaniards and whites can be called Mexican. Perhaps no class of men are beter prospectors than the Mexican gambocinos. They are not good miners, but good gold hunters. They seek the gold and yellow metals by instinct and when a pay streak is found they work it patiently and go to the nearest town with their dust and over liberal potations of Meseal tell of the "grande oro" which they have found. Yet these same Mexican gambocinos are secretive as a sphinx drunk or sober; and it is only by following them (sometimes to death) that the more acute white man has found the "place of gold."

Lower California, owing to its peculiar formation both in organic and unorganic life, is hard to prospect, yet the fact remains that it is rich in mineral wealth from its capital city, La Pez, in the South to the boundary line on the north that separates it from California. Part of the peninsula is sterile, waterless, and desolate. Craggy mountains rise to immense heights, deep, dark, desolate canons make travel almost impossible, and a wilderness of volcanic and changed igneous rock seems to fill all space in places.

The geological conditions can hardly be read. Granite, porphyry, quartz, schist, basalt, slate, and a hundred other forms of God's handiwork mark the country in unclassified profusion. Especially is this so from the center of the peninsula to the south although the northern half is by no means an easy road to travel.

Nevertheless several companies have opened up propositions in the northern section and gold in paying quantities is being brought to light.

The Lower California Gold Dredging Company own about 410 acres of first class placer ground located about ninety miles south of the Mexican town of Campo on the northern border. The placer is located in what is known as Golconda gulch and the dirt runs all the way from 50 cents to $3.00 per cubic yard. Bed rock is from twenty to thirty feet down. Engineers estimate that the outfit has the tidy sum of $8,000,000 in sight at $1.00 per cubic yard. The bed rock is mostly a decomposed granite, and the gold is quite coarse, coming out in small nuggets from the size of a needle's eye to a kernel of wheat. The outfit has a 40,000 cubic yard dredge on the ground and at work. Business commenced about December 1st, last. Water is plenty to float the barge and for other purposes. They also have a sawmill and plenty of timber. The company estimates that they can take out the gold for 8 cents a cubic yard and this means a profit (on their figures of a dollar a cubic yard) of 92 cents on every cubic yard taken out. The concern is in good shape financially, it does not owe a cent and has plenty of cash in the treasury, which in this case is the First National bank of Los Angeles. The president of the outfit is Mr. Thomas Doak of Riverside and the secretary F. C. Sharp of Los Angeles. The concern is represented by Charles B. Kaiser a prominent financier of the same city. All things considered things look good for this concern.

Ensenada is a beautiful little seaport town on the Pacific ocean coast aout 115 miles south from San Diego. Here summer and winter the temperature is about the same and it is like a fairy land. The place is reached by steamer. From this place you go about seventy-five miles in a southeasterly direction and reach a Mexican town called Alamo. The trip can be made by stage, wagon, or automobile. At this point is located what is known as the Alamo Mining district and from all accounts it has proved to be a fabulously rich one.

Among the mines here is the San Vincente Mining Company's property of about fifteen acres. The proposition is gold. A shaft down about 150 feet tells what has been done. The ore runs over $100 in gold per ton and the company has a large pile of it on the dump. Some of it has been taken to a custom stamp mill about two and one-half miles away, but before long they intend to put in their own stamps. The ledge is from three to five feet wide and widens with depth This company is not making much noise, but they have a mighty good thing and intend to go ahead and make a mine. The president of this company is Mr. A. N. Hamilton, D. F. Wilson is secretary, J. C. H. Von der Lohe, treasurer and A. L. Reed, general manager.

The Alamo district, as it is called, is about four and one-half by one and one-half miles wide and since white men began to work here in the year 1887 more than $10,000,000 has been produced.

The Aurora Consolidated includes nineteen groups of claims, two stamp mills of ten stamps each, a power plant costing $100, a plant to convert wood into gas and from gas to electric power, besides other machinery.

It was in this district a few years ago that $20,000 was taken out at an expense of only 200 dobies. One ton of ore was taken out that run $240,000. This outfit is owned now by Douglas, Lacy & Company of New York. More than 10,000 tons of tailings are on the dumps that will run $7.50 a ton.

The Abilena has a shaft down about 120 feet and has taken out in the neighborhood of $75,000.

The Princessa has a shaft down about 380 feet on a vein four and one-half feet wide averaging $50 a ton in the yellow metal.

The Ulysses shaft is down about 300 feet in ore on a five-foot vein that runs all the way from $4.00 to $30.00 a ton. This mine is not working.

The San David has a shaft down 350 feet on the same lead as the Ulysses and it is a good proposition.

The country is supplied with an abundance of wood and water, and in many places are flowing hot and cold springs. Mountain sheep and deer are plentiful. About ten miles distant (easterly) is a beautiful fertile valley with a number of fine ranches.

Few prospectors are wandering about the country although there is a fair show for them to strike luck.

One of the pioneers in this section was Major H. M. Russell now of Los Angeles, but formerly of Colorado. Major Russell is an expert in the mining business and operated in Boulder, Gilpin and Leadville way back in 1865. It is to Major Russell the credit is mainly given for discovering tellurium and an interesting story could be writen about it.

The Major went to Lower California in 1888, and by his eforts the Alamo camp was built up. The Aurora propositions were all operated by him at one time. He sold his interests to the Douglas, Lacy concern and these people now own a majority of the stock. Major Russell, however, owns large mining interests in Lower California

and elsewhere and is a mining man of high standing and repute.

The story of the discovery of gold in the Alamo country is somewhat sensational. It appears that a Mexican whose name is withheld, had been sentenced in lower Mexico to be shot for crime. He escaped and came to relatives who lived in the neighborhood of Escanada and hid in the mountains near Alamo. While in hiding he discovered rich placer gold. This he gathered and took to his father who lived in the town. The father supplied him with provisions. After a time the gold discovery leaked out and there was considerable excitement. From nothing Alamo built up to a town of several thousand people in a few months, many going there from Los Angeles and other California towns. This was in 1887, and in that year rain was abundant and water plenty, consequently the placer boom was at its height and millions were taken out. It is a rich country yet, and many Mexicans and Chinese make good wages with the pan. The largest placers were in Alamo and Visnaga gulches.

The largest and most successful copper mine in Mexico is located in Lower California and but little is known about it. It is located about midway between the north and south ends of the peninsula on the gulf near the town of Santa Rosalia. The mine is the Compagnie du Bolio and is controlled by a French syndicate in turn controlled by the French house of Rothschilds. The property is one of the richest in the world and by reason of the peculiar formation most of the drilling is done by hand. The company have made extensive harbor improvements, have a plant for distilling gulf water and every appliance known to produce copper. Many Chinese and Japanese are in their employ in addition to native Mexicans. These people have special privileges granted by the Mexican republic. The matte is shipped in their own vessels to Falmouth, England, to be treated. The concern is capitalized for 20,000,000 francs ($4,000,000) and its output last year is said to be over 23,000,000 averdupois pounds of copper.

This mine has been in operation for nearly a quarter of a century and at times over 2,000 men have been at work there at one time. Few persons are admitted within its almost sacred precincts. Its machinery is modern and scientific and it is one of the best managed concerns of its kind in the world. France and England furnish most of its supplies.

Both shores of the narrow peninsula present many wonders, remarkable and startling. The country is wonderfully interesting in many ways, and in time this rock ribbed peninsula with the mighty Pacific on one side and the waters of the Gulf of Lower California on the other, will be found to be a land hiding within its rocky breast untold millions.

There are many other mines, prospects and conditions in the northern part of Lower California that will receive mention in another story at another time.

Rib Drawing by Machinery

(By Fred Mitchell, Patton, Pa.*)

If the question, "Can pillars be drawn successfully by machines?" means taking out all of the coal under any conditions with machines, I have not seen in my experience where it can be done.

However, there are conditions, where pillars can be drawn with the machine. If the roof is of sufficient strength to allow the drawing of a pillar without the places caving in, then it is possible to take the pillar out with the machine.

There are several things that should be taken into consideration before attempting to take out pillars with machinery, i. e., the nature of the roof and bottom, the texture and height of the coal, the height of the overbearing strata and the inclination or declination of the vein and the width of the room driven.

All these conditions should be considered in determining the width of the pillar, which should be uniform size and of sufficient strength to break the roof whenever it has a tendency to cave in. Before starting to take out the pillar the roof should be examined and also the condition of the props in the room.

If a room has been standing for some time it is probable that the props are somewhat decayed. If that is the condition, it will be necessary to set new props, setting them as tight as possible. I would not recommend the use of the machine unless the roof was of sufficient strength to allow the props to be kept far enough back so that the machine would have space to work without the necessity of changing the props. In making the first cut through the pillar it is possible to take a good width if the condition of the roof is favorable.

Care and caution should be exercised in making the last cut, as it may be possible, if the machine is cutting through to a caved-in place, that the roof is broken over the coal and considerable pressure may be released in cutting through, thereby increasing the risk. Sprags should be put in under the coal and the machine should be followed with a row of props set as close as possible to the coal.

In starting the second cut across, a stump should be left next to the first cutthrough, of sufficient size to hold the roof until the cutthrough is made, which should not be as wide as the first cutthrough.

It is sometimes possible, with the puncher machine, after the cutthrough is made, to turn it around to cut toward the first cutthrough, if the place has not started to work.

It would not be advisable to use the electric chain machine in that way, as it is not best to try to use it where it is necessary to take out props to make room for it and it is too heavy to get out of the way, if the roof suddenly starts to work.

If the place has started to work and shows no indication of caving in, the stump should not be weakened until the place has caved in. Then it would be advisable to start at the back end, bringing it out with pick mining.

Taking the back end out first and working toward the roadway has a tendency in case of pressure to throw the weight toward the back end of the pillar. Whereas if the front end of the stump is taken out first it would have a tendency to throw the weight down the roadway, probably lose some of the coal, also lose all chances of working the machine to any advantage in that same pillar again.

The greatest success I have experienced in drawing pillars with the machine, is in pillars 40 to 50 feet in width, driving through in the form of a room and drawing the stump out with the pick.

Statistics show that there are more men injured drawing pillars with the pick than with the machine. The reason is that the pick miner works close to the coal and accidents generally occur when there is a great pressure of the roof and the miner is undermining coal, when the coal sometimes falls suddenly before the miner can get out of the way. Whereas, if the coal falls while undermining with the machine, the persons working the machine are generally back beyond the reach of the coal.

It is, however, not advisable to risk the machine where pressure is so great as to cause the coal to fall while undermining. The roof may suddenly start breaking and the great noise made by the machine would prevent the persons running the machine from hearing the roof break.

In my opinion, it would be good policy not to consider how much coal can be taken out in going in with the room, but how much can be taken out in coming back. Then the coal is of sufficient height to take the car in without any additional expense in taking up the bottom, drive the room in as narrow as possibly can be done without increasing the cost.

Leave, say, forty feet of pillar, drive through it in coming back, leaving a stump of sufficient size for protection in going through, the size of which may be determined by the nature of the roof. After cutting through take the stump out with the pick, the road being along side the stump.

I have taken such a pillar out and not lost any of the coal, and seventy-five per cent. of it has been dug by the machine. If a method like that were put into practice such a thing as creeps would not need to be discovered, as they would not exist.

*Paper read before Patton District Y. M. C. A. Mining Institute.

Geological Field Work at the Colorado School of Mines

By CHAS. E. SMITH, Instructor in Geology and Mineralogy

A good mining engineer should be a good field geologist, and a good field geologist of the present day should at least have some preliminary training along the following lines:

1. He should know how to do rapid and accurate plane surveying. He must be able to locate himself quickly in the correct quarter-quarter section of land and refer his location to a gorernment corner which he is able to check, to establish a meridian line and to determine the variation of the magnetic needle.

2. He should be acquainted with the instruments in use by field geologists, viz: the compass, clinometer, hand level, aneroid barometer, and plane table.

3. He should know how to pace accurately, not only over smooth ground, but in rough and brushy territory. A good pacer can make a location as accurately as it can be shown on a map of ordinary scale. Greater accuracy is not demanded.

4. He should be able to judge distances and elevations accurately. This means short distances over obstructions like gulches and tree tops, where the line cannot be paced, and elevations like low cliffs, which one does not wish to climb but which ought to be shown.

5. He should know how to keep an intelligible set of notes; intelligible not only to himself, but to another. All his locations should be easily checked by any other good worker at any time.

6. He must know how to collect from the field and to classify a comprehensive set of specimens. On this collection will depend, to a large extent, the value of his map.

7. After knowing the above he should be able to compile, from the notes and examination of samples, a geological map, and to draw sections both horizontal and vertical.

8. A good scientific report on the area mapped is of the highest importance, and unless he is able to make this report, his other work has been done to litte purpose.

9. If there is no topographic map, or, if the one which may exist is full of inaccuracies, he should know how, while collecting his other data, to collect notes for a good topographic map and not use very much extra time. The care which should attend the location of outcrops, stream beds, faults and the like, is sufficient for the data on which to construct this topographic map.

An attempt to emphasize all these points at one time would presume too far on the capacity of the student and demand more of his time than he is able to spare in any one year from his already well filled schedule. The geological department has found it desirable, therefore, to give a portion of the field work in the Sophomore year and the remainder in the Senior year.

No field work is required of Freshmen. A few observation trips are taken each fall for the purpose of fixing points mentioned in lectures and text. This is not called field work. To the Sophomore class is given the more mechanical portion of the work as outlined under the nine heads above. Points seven and eight will not, therefore, be emphasized in connection with this course, but will be reserved until the student has completed the courses in mineralogy, crystallography, junior geology and eithology. In short, the Sophomore will receive attention along these mechanical lines necessary to make him a trained assistant. In connection with junior geology no field work is required, but illustrative trips are taken as in the Freshman year, and good reports of these trips are expected. The Junior is given practice in drawing vertical and horizontal sections. Senior field work forms a fitting conclusion to the work of the department for the four years. It is the application of the knowledge gained in these courses to the field itself. It will tax the powers of the student to recognize minerals, rocks and fossils as well as the ordinary dynamics of geology. Our best efforts will now center about points seven and eight. Familiarity with the mechanics of field work will be assumed and no farther instruction along this line will be given. The finished geological map and the complete report is now the aim. Trained as a field assistant while a Sophomore, he is now to assume the role of the "Geologist in Charge." It is within his province to correlate, to classify and to theorize.

To apreciate fully what the Sophomore work means, a more detailed description is neccessary. The class is divided into squads containing about five studens each. It will be assumed that there is no topographic map of the region assigned to the squad, or if there is one, it is inaccurate. Freshmen surveying has prepared the student to run section lines, to locate himself both horizontally and vertically on the face of the earth, and to establish a meridian line by which he may orient his map and determine the magnetic variation of any locality. After the squad has done this necessary preliminary location work, it will run a traverse line through the area to be mapped, and along this line at convenient points, will establish elevation bench marks. This line when completed will constitute a line of control for the whole area. No more work with instruments of precision is necesary. From now on a pocket compass will be used for line, an aneroid barometer for vertical location, and the horizontal locations will be made by pacing.

It is a well-known fact that atmospheric pressure is variable. Today we may have low pressure conditions followed by wind and high pressure conditions tomorrow, and occasionally this daily variation is equivalent to the barometric change due to a difference of elevation of 500 to 1,000 feet. How, then is the aneriod barometer of any use in determining the location of contours for a topographic map? It is a poor instrument if simply carried about and read without a proper check. To check the readings, three courses are open to the user.

1. He may read the barometer beside a bench mark of known elevation, then at A, B, C, D, and E, five points of known elevation, after which he may return to the bench mark and read again. If he has been out all day there is likely to be a difference between the first and last readings. Suppose all the time intervals between readings to have been equal, and suppose the difference between the first and last readings on the bench mark to have been sixty feet, with a falling barometer. Ten feet will be subtracted from the reading at A., twenty feet from B., thirty feet from C., forty feet from D., and fifty feet from E. (It will be remembered that a falling barometer means decreasing pressure and therefore the readings have been too high.

2. Two barometers may be compared in the morning, one taken into the field while the other one remains in camp to be read every half hour by an assistant, who keeps a careful record of these readings. This record will

*School of Mines Quaterly.

show atmospheric changes and constitute a check for all reading of elevations taken from the other barometer. Gradual atmospheric change is the rule, but it is by no means certain. Instances are not rare in which a change representing a difference of one hundred feet has occurred in one hour, after which conditions have become normal again before the end of the day. If the aneroid is used with the first method, no check would be made on readings which may have been one hundred feet too high or too low, therefore, the second method is preferable.

3. Keeping one idle in camp is expensive, and, furthermore, there is no certainty that he will not grow negligent at such a task. To obviate the necessity of this expense and to eliminate the personal equation from the check, the barograph has come into common use. As its name implies, it is an instrument, which, by a line, represents the variations in air pressure. Sheets to receive this line are specially ruled, horizontally to show variations in pressure and vertically to show time of day and day of week. Each sheet will hold the graph for one week. Clock work turns a cylinder, carrying the sheet around once a week, and a pen, which is really the pointer of an aneroid barometer, rests lightly against the sheet as it turns. Sheets are dated and filed away. The user of the barometer dates his notes and records the time of day whenever he reads an elevation and at any time can check out his errors by comparing with the proper barograph sheet. This method is much used now by government topographers and will be used in connection with Sophomore field work.

Each squad goes into the field equipped with pocket compass, barometer, chinometer for taking the dip of rocks, hammers, papers for wrapping speciments and a sack for carrying them. For practice about four lines will be run through a section of land, with barometer readings taken every one hundred paces. To illustrate: let the squad begin at the southwest corner of a section and run north along the section line, one man at a time being responsible for keeping the line and reading the barometer every hundred paces. The other men keep notes and scour the field ahead to right and left of the line for outcrops of rock or anything which should receive attention. On finding anything of interest the pacer is waited for and is asked to pace from his line east or west to the outcrop, if such it is. This locates it with reference to the section corner where work began. Whenever the line of control is crossed the nearest bench mark is found and the barometer checked. If at the end of the mile, the northwest section corner can be found, the error in paces should be noted and distributed over the line run. Now run east one-fourth mile and turn south, running parallel to the first line. It will be seen that, with all elevations so obtained and checked, a good topographic map may be made, and also, if geology is studied and specimens collected at the time lines are run for topography, that all the locations necessary for the final geological report will be required. ly made than is possible by going haphazard over a field already mapped topographically. Systematic notes, a good collection of specimens correctly labeled as to location, a finished topographic map on which may be placed as much geology as the students are able to interpret, and a short geological report will be required. When the student is familiar with this course as outlined he should be prepared when a Senior to lend his mind especially to geological problems and reports for which, as a Sophomore, he had no adequate preparation.

Golden, Colorado, Sept. 28, 1907.

The Far Northwest

J. C. M. McGriff, of San Francisco, and heavily interested at Circle, Alaska, was in Denver a few days ago and gave Mines and Mining some interesting information of that far northwestern territory. In speaking of railroads in Alaska he says it may not be generally known that the work of opening up that remote region by railroads is under way. He has been informed that the Guggenheims have let a $25,000,000 contract for a railroad on their Copper river line, where several small roads are in operation and others projected.

"A railroad is now in operation between Skagway and White Horse, a distance of 110 miles. This is known as the White Pass & Yukon Route railway. It pays heavily. The traffic is much larger than was anticipated when the road was projected. There are two other railroads in operation on the Seward peninsula. One operates from Nome, and the other from the town of Solomon. I am not very familiar with their route, but I know that the "Wild Goose," which runs out of Nome, goes north into the Council City district. The one from Solomon runs in the same direction.

"The Guggenheims, which, of course, means the American Smelting & Refining Company and allied concerns are building the Copper River railroad. This road is projected from Copper Center, along the Valdez and Fairbanks trail, to Fairbanks in the Tanana district, a distance of 360 miles will open up a rich territory.

"The same men who built the White Pass & Yukon Route railroad are reported to have projected a railroad from Delta, on the Tanana river, to Circle, with a view of closing the gap between Fairbanks and the Yukon river, and there connect with the boats of the British-Yukon Navigation Company which is controlled by the same people who control the White Pass & Yukon Route railroad. Dawson is now the boat terminal, but according to the plan which has been outlined, boats will be operated between Dawson and Circle. Thirty miles of narrow gauge road, from Fairbanks to Delta has been built.

"Transportation companies are anxious to secure the business from the Tanana district. Fairbanks is a large shipping center and that is the place which the railroads are trying to reach. The competition among the companies will assist in the development of that section.

"There is a proposition being worked out to build a railroad from near Kniko, on Cook's inlet to Nome. The construction of this line would eliminate the long boat trip which is now required to reach Nome and other points on Seward peninsula. It is now necessary for boats to skirt Alaska peninsula and pass through a part of the Bering sea to reach Nome.

Present and projected rail and wagon roads in Alaska: The only completed railroads are those from Skagway to White Horse, from Nome and Solomon north into the interior of Seward peninsula, and a short narrow gauge running east from Fairbanks. The principal projected railroads are from Orca on the Gulf of Alaska to Fairbanks via Copper river, and from Kniko on Cook's inlet to Nome via the Mount McKinley mining district. The government wagon road across Alaska to Nome has been begun.

"The road, it is said will also tap the McKinley district on the way to Nome. This is a rich district. The railroad will be the highest in the United States, and the route will be long and tortuous. I am told that Holland capital is behind the project.

"It may be of interest to many people to learn that the government is constructing a wagon road from Eagle, near the eastern boundary line of Alaska, westward, with Fairbanks as its present objective point. This road ultimately will be extended to Nome on the Seward peninsula, and will be about 1,500 miles long, cutting as straight across Alaska as the topography will permit.

"The road is being built, not only for public convenience, but for moving troops overland in winter. This is not difficult in summer, but in winter is a serious problem. The road will be built along the tops of the divides as much as possible. The roads down here are built in the valleys, but many of the valleys and much of the lowlands in Alaska are turned to swamps in the summer. Corduroy roads would have to be built over the swamp places and repairs would have to be made frequently.

"The government is building other wagon roads, but that is the principal one. The government appropriated $250,000 for road building in Alaska this year, and Alaska appropriated $100,000. A wagon road from Circle to Fairbanks has been surveyed and work is being done."

Outline for Report on Ore Dressing Plant

BY THE FACULTY OF THE COLORADO SCHOOL OF MINES

GENERAL INFORMATION.

Name of plant.
Owners.
Operators.
Location.
Plan of plant, showing location of buildings and of departments.
Transportation facilities.
- For receiving ore and supplies.
- For shipping products.

Nature and source of ores treated.
Flow sheet, showing each step in the treatment, and number of machines used.
Power.
- If steam, give details of boilers and engines.
- If water, give details of wheels and quantity of water used.
- If electricity, give details of motors.

Fuel.
- Source.
- Cost.
- Quantity used.

Water.
- Source.
- Head.
- Regularity.
- Horse-power developed.
- Quantity used for various purposes.

DETAILED INFORMATION.

Receiving and storing of ores.
- Bins.
  - Location.
  - Number.
  - Size.
  - Capacity.
  - Construction.
  - Charging.
  - Discharging.

Sampling.
- Bins.
- Chutes.
- Breakers: kind, size, position, space at throat, products.
- Rolls: kind, size, position, space, method of controlling space, springs.
- Kind of sampler.
- Proportion taken.
- Number of cuts.
- Control of feed to sampler.
- Discharge of products.
- Number and size of assay samples.
- Proportion borne by weight of final sample to that of ore sampled.

Treatment of the ore.
- Grizzlies.
  - Size.
  - Construction.
  - Slope.
  - Space between bars and method of control.
  - Character of iron used with cross section.
  - Method of anchoring.
  - Destination of product.
- Breakers.
  - Kind.
  - Size.
  - Capacity.
  - Speed.
  - Breaking part; size, shape.
  - Jaws; material and amount of wear.
  - Feeding.
  - Maximum size of feed.
  - If water is used, how applied.
  - Maximum distance of jaws apart at throat.
  - Minimum distance of jaws apart at throat.
  - Maximum size of product.
  - Amount of wear per ton.
  - Repairs.
  - Destination of product.
- Rolls.
  - Kind.
  - Size.
  - Capacity.
  - Speed.
  - Space.
  - Adjustment of space.
  - Arrangement of springs.
  - Feeding.
  - Size and source of feed.
  - Size of product.
  - Angle of nip.
  - Method of driving.
  - Horse-power required.
  - Tires, how attached.
    - Original and final thickness and character of wear.
  - Amount of wear per ton.
  - Repairs.
  - Destination of product.
- Screens.
  - Kind.
  - Size.
  - Capacity.
  - Slope.
  - If water is used, how applied.
  - R. P. M.
  - Impact; number and nature.
  - Attachment of screen cloth.
  - Amount of wear per ton.
  - Feeding, source and method.
  - Housing.
  - Delivery of products.
  - Destination of products.
- Jigs.
  - Kind.
  - Number and size of compartments.
  - Capacity.
  - Feed.
  - Impulses; number, amount, and nature.
  - Water; where and how applied.
  - Gate and dam; make sketch.
  - Screens; mesh, material, and support.
  - Height of tail board.
  - Drop between screens.
  - Kind of bed and depth.
  - Products; hutch, coarse concentrates, middlings and tailings; quantity and nature of each.
  - Destination of products.
- Fine grinders.
  - Kind.
  - Size.
  - Capacity.
  - Horse-power required.
  - Size of feed.
  - Attachment of shoes and dies.
  - Wear of shoes and dies.
  - Scrapers; attachment, size, and wear.
  - Screens; attachment, mesh, and wear.
  - Repairs.
  - Size of product.
  - Destination of product.
  - Kind.
- Classifiers.
  - Size.
  - Capacity.
  - Adjustments.
  - Feed; water ratio.
  - Application of hydraulic water.
  - Discharge; control and character of spigot product.
  - Destination of products.
- Tables.
  - Kind.
  - Size.
  - Capacity.
  - Feed; water ratio.
  - Wash water.
  - Character of surface; riffles, grooves.
  - Slope.
  - Number of impulses.
  - Character of motion.
  - Sketch of mechanism.
  - Color sketch of distribution of materials.
  - Destination of products.
- Settling boxes.
  - Dimensions.
  - Capacity.
  - Shape.
  - Feed.
  - Discharge.
  - Products.
  - Destination of products.
- Slime ponds.
  - Dimensions.
  - Capacity.
  - Feed.
  - Time of treatment.
  - Discharge of products.
  - Destination of products.
- Launders.
  - Dimensions.
  - Slope.
  - Material carried.
  - Water ratio.
  - Destination of product.
- Additional topics not treated elsewhere.

Experiences of a Young Engineer—II

Being Letters Bob Braun Wrote to His Former Roommate, Theodore Gillespie in South America

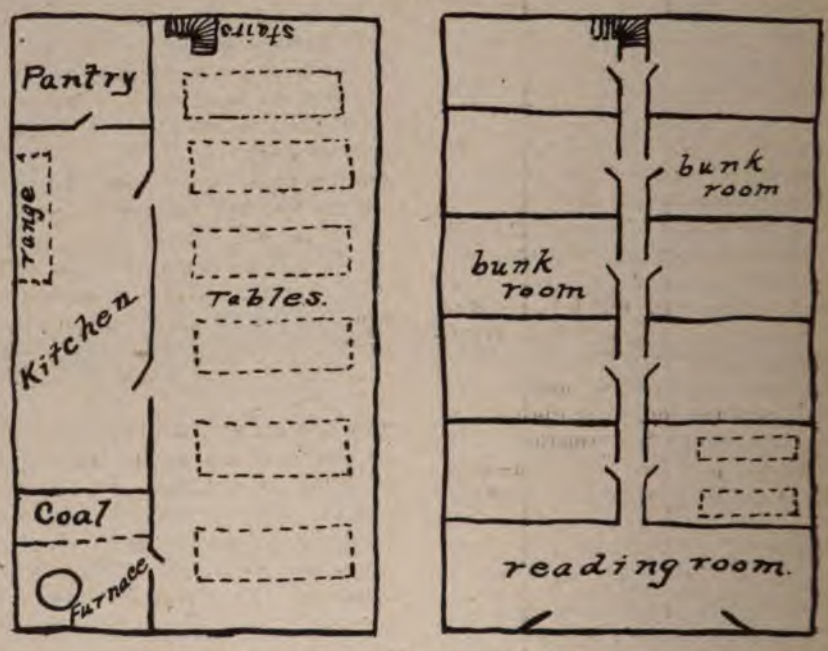
Dear Ted: I had been wondering until your letter came whether you had again failed to receive my letter or whether you had concluded not to answer it, but the explanation of the route the mail must take to reach you will account for all delays in the future. As I promised in my last letter I will write of my experiences at the American Flag mine, the San Juan property I mentioned. I left there for Bingham Canon the day after your letter came last Wednesday and delayed answering until this week. I had the title of engineer or assistant superintendent at the American Flag and the company employed about eighty men. Mayburn, the "super" was one of the queerest combination I ever had the pleasure of knowing—I say pleasure, for it is interesting to study such men, even though the subject isn't particularly pleasant. The fellow held his position because of an interest in the mine, which he purchased when the company was organized. That reminds me of a letter I received while in Arizona from a firm on Broad street, New York, offering me $1,800 a year and expenses, which I gladly accepted, but about ten days later I received an answering letter saying the firm thought it advisable to employ a man, who could become financially interested in the property as they thought he would do better work if such was the case, and that the position was still open if I would invest from $4,000 to $5,000 in stock. That is a beautiful theory, but in practice it would completely fizzle. In the first place I do not think a good engineer would invest his money in any stock proposition unless he could get in on the ground floor, so they are apt to catch a hot one if they catch any at all. For my part I would work just as hard for the sake of my reputation as I would to save my money, for while a reputation can be exchanged for money, it wont work vice versa.

However, to return to Mayburn. I understand he was acting as a go-between in deals between eastern parties and mine owners, and in order to put through this American Flag deal promised to put in some $6,000—all he had—providing he was given the job of superintendent—for life I suppose. Naturally I didn't find all of this out until I had been there some time, but I know there was a tight wire some place from the fact that he could hold down the job. One reason for my acceptance of the position was the hope of replacing him, (whom I sized up about right the first time I saw him), and I left when I found there was no chance. Mayburn, or "Old House-a-Fire," as some of the miners called him, was ignorant, egotistical and irritable. Considering the fact that he had been around mining camps for thirty years, his ignorance was appalling, but his egotism would come to his rescue, and he would reason something after this manner: "I have been engaged (?) in mining for over thirty years, therefore I ought to know a great deal—at least more than a young fellow only two years out of school." Consequently I was balked on every move outside the pale of his wide (?) experience.

Although he was pretty decent to me as a rule, he often flew into a rage and cussed the men—just because he had the authority—and the result was that it prevented my getting the work out of them that I could have otherwise. As one of the miners said, "You know that guy is going to cuss whether we do our work or not, and we will get fired sooner for telling him where to go than for loafing."

Although I was assistant "super" and had direction of the underground work that Old Mayburn laid out, yet I wasn't allowed to fire a man except on his orders. I was indeed glad when the chance came to go to Bingham and I left on short notice.

I don't know who has taken my place there, but hope Baker got it. He did the assaying and helped me with the surveying, and is a good hard worker. He isn't brilliant, but a brilliant chap wouldn't do Mayburn any good, and Baker could fill the place as well as anyone. One reason for my wishing him to get the place, is the fact that he was married just a few weeks ago while home on Christmas vacation. He has a dear little girl for a wife, and they are as happy as two mortals can well be. Have you ever thought, old chap, about getting married? The idea has been bothering me ever since Baker came back from Chicago with his "Hun" as he called her. I don't intend to live in single blessedness all my life, and I am receiving a salary large enough to provide decently for any girl, but I'm doubtful whether the girl to whom I've been sending Christmas and birthday presents for the last few years is the right one. This coming summer I am going to ask for a short vacation and will go back to see.



1—Ground Floor Plan. 2—Upstairs Plan.

Before I leave the American Flag subject I had better give you some idea of its size. There were about 1,200 acres in the total holdings of the company, and some of them are well mineralized, although the ore is in large low-grade veins. A short time after I came the bunk house burned down, and in excavating for a new one a blind ledge was opened up that had an excellent showing. It has not been further prospected as yet, as miners are rather scarce in those parts. The company isn't bothered about ore, for they had some $2,000,000 gross blocked out when I left. The bunk house I mentioned above was one of Mayburn's engineering efforts, about the best he ever made I should say. I forgot the blue prints of the plans that

I intended to send to you, but have written to Baker for them. I will enclose a rough sketch, so that you can get an idea of its possibilities. It was designed for use as a boarding house as well as bunk house, and it was Mayburn's theory that he could save lumber and utilize all the heat from the cook stove by combining the two. The ground plan contains a kitchen, pantry, furnace room and dining hall, as shown in the sketch. The tables will accommodate eighty-four men at one time, but as there were only about sixty-eight single men working, Mayburn, Baker and I used the extra table. The up-stairs contains bunk room for forty men and was filled up, the rest of them sleeping in the old boarding house. You can see from the position of the range and furnace below how the heat could be used by piping the steam to each part of the upper floor. The range took care of about one-third, and the furnace of the remainder. The bunks were double-decked beds, two in each room, and placed on each side of the window. Taken altogether the bunk house was very convenient for the men, and they appreciated it exceedingly; however Mayburn seemed more interested in the uniqueness and completeness of his design rather than in how the men would like it. Baker and I bunked in a cabin all to ourselves, while Mayburn slept in the office.

Well, I must close this letter as it is bed time, and I have told you everything up to the time I came to Bingham. I haven't been here long enough yet to know the ropes, but the place is about five per cent. American, and ninety-five per cent. foreign—composed of Austrians, Slavs, Italians, Hungarians, etc. There isn't much to do but work, and I am doing that with a will. I hear there are some original caving methods in use in some of the mines up the canon and I will probably be able to tell you something about them next time. With best wishes for your success, in the Chili trip, I am,

Yours as ever,

BOB.

A large exploration company operating in Mexico usually strips the outcrop of the vein unless already exposed, as it allows a closer study of the geology and has several times resulted in opening unknown ore shoots.

If the diameter of a tank of known height is desired for a required capacity, it can be found by dividing the necessary cubic capacity by the height in inches and extracting the square root, which will be the diameter in inches.

NOTES ON TUBE MILLS.

I had come to the conclusion some time back that manganese liners had not been given a fair trial before being condemned, as at the Glen Deep, the life of manganese liners was about ninety days, while at the Robinson Deep, the liners lasted only about fifty days, says a writer in the August number of the Chemical, Metallurgical and Mining Society of South Africa. I therefore set to work to ascertain the cause of this marked difference in life, and in endeavoring to approach as nearly as possible the real thing, that is, manganese lining, I found that by loading a glass jar with small pebbles, which had been discharged from the tube mills, the pebbles reaching just under the neck of the jar when lying on four rollers, and clean sand and water at 1 to 1 being added to reach just under the center of the jar, the jar then being made to revolve, the result was just as I had anticipated. Instead of the load being raised sufficiently high to enable the pebbles to roll and tumble over one another, the load, with the exception of a few pebbles, slipped on the side of the jar while revolving.

More pebbles were then added to bring the load well up over the center, and the jar was started again. This time, much to my satisfaction, the pebbles, with pulp clinging to them, began rolling and tumbling over one another down the inclined surface of the load, formed by the rotary motion of the jar.

It is interesting to note how the pebbles and pulp rise at the ascending side of the jar, although to all appearances the water is level to about the outflow on the descending side.

Some members might still be of the opinion that this experiment does not prove that the grinding is not done by impact, and for their benefit I should like to explain that, in this experiment, when the jar was underloaded there was scarcely any sound noticeable while the jar was revolving, but when the pebble load was increased to the point mentioned, there was the noise of the pebbles striking the liner, which coincides with S. H. Pearce's experience while the manganese liners were being tried at the Glen Deep. Mr. Pearce stated that a good deal of difference was noticed in the sound of the tube mill when this liner was first run, inasmuch as there was an absence of rumbling, which had been a feature previously. He also stated that there was a tendency for the pebbles to wear flat, and the crushing efficiency dropped considerably. Later, the rumbling occurred again, and the crushing efficiency increased. He also concluded by remarking that he supposed that there was considerable slip on the smooth surface when starting, and that later the liner had acquired a rough surface and had raised the pebbles a little higher than the smooth surface had done, which fact causes crushing to be accomplished instead of reduction by attrition. The manganese liners when discarded at the Robinson Deep were as smooth as glass, and this proved that Mr. Pearce's supposition was incorrect. The sole cause of the absence of rumbling and the dropping of efficient grinding was that the mill was underloaded. An important point, which appears to have been overlooked when advocating the theory of crushing by impact is that, as soon as the rolling or falling pebble touches the water, the pulp clinging to it becomes disengaged, and the bare pebble strikes the liner, and this accounts for the rumbling referred to.

With reference to hydraulic classification, I run seventeen classifiers, five abreast in the first row, and six in the two following, and use water on all, finding it essential to do so when dealing with a big tonnage with a limited tube mill installation.

The longest life of silex liners four inches thick, I have experienced, is 108 days, and a lining of local chert four and one-half inches thick, has been running for 102 days and to all appearances will last a fortnight longer; but it seems that the days of silex and chert are numbered, judging by the success attending the lining accidentally invented at the Los Estrellas mine at El Oro, Mexico, where the inventor had lined his mill with riffle-like castings, in order to raise the pebbles nearly to the top of the mill, thus increasing the height of drop. When the mill was opened after several hours' run, it was found that the pebbles had become wedged into the riffles, and thus formed a lining of themselves. After eight months' run the wear to the casting was found to be so slight as to indicate a life of two to three years.

Manganese is a very common mineral as a constituent of minerals and rocks, but is very seldom foupnd in paying veins. It occurs abundantly in the cherts of Coast Range in California.

The floor of an adit in a Park City, Utah, mine is boarded over completely and although a horse is used for motive power, the grade of the track and the care with which it has been laid allow a large tonnage to be handled.

Mining Letters from Correspondents

Mines and Mining Wishes to Secure an Actual Reputable Correspondent from the Mining Centers of the World

Denver

Dec. 26.—The holiday trade throughout the state has been surprisingly large. Not as many high-priced goods purchased as last season, but more low-priced articles. About all departments of business indicate retrenchment and we do not anticipate much revival until well along in January. The mining districts are in first-class shape for future operations, but many of the lode mines have reduced forces, and output correspondingly, while the placers have been closed down a month to six weeks, and will not be started up before some time in May or early in June. The larger and more developed mines of the state, however, will boom along at about their usual winter gait. But generally speaking, the mines were never as well equipped and developed in the past as they are at this time, and within thirty days revival will set in and continue steadily until the height of the midsummer season is reached. All things considered, the outlook is promising and the clouds are lifting.

Three or four state banks of the San Juan have closed their doors temporarily, but it is understood their assets are in excess of their liabilities, and as soon as they can recover on their securities they will reopen and go on again. It is claimed depositors will be paid in full, but will have to wait awhile for their money.

Dispatches from Washington state that the extension assessment bill passed the Senate before the holiday adjournment, and is now laid up in the House, where it will probably find its way to the waste basket.

A petition was filed in the Federal Court a few days ago in which the receivers of the Animas Power Company of the San Juan are trying to straighten out its entanglements with its contractors that will make a difference of about $4,000 a month in its income. It is charged that the Telluride Power Company and the Animas Power Company entered into a mutual agreement to divide territory in Ouray and San Juan counties and thus suppress competition, in restraint of trade, and therefore a violation of law. Time was also asked to investigate the contract relations between the Animas company and Camp Bird Mining Company, Limited, which is also a party to the tangle.

The companies were given until the first Monday in January to show cause why the receivers of the Animas company should not be allowed to ratify a contract between the Telluride company and Camp Bird people in which a contract between the Animas company and the Camp Bird was assigned to the Telluride company. The receivers, John A. Clay and James D. Mortimer, want to be protected and want all contracts between the parties ratified by the court.

The original contract between the Animas and Camp Bird people provided that each should protect the other's interests in the Ouray and San Juan fields and keep from competing by paying each other for the transmission of power over the other's lines. It is charged that the Animas company failed to comply with its contract with the Camp Bird company in some respects, one of which was the failure to put in an auxiliary transmission line.

It is also claimed that the receivers are at a disadvantage because the Camp Bird people now refuse to recognize any contract relations with the Telluride company and have paid rentals for power furnished at the rate of $4,000 per month to the Animas company, the latter company in turn giving the same amount over to the Telluride company after it acquired the assignment of the contracts. The receivers want some better consideration than the contract between the Telluride and Animas companies to protect this income.

The following abstract of the assessment of the county and city of Denver, just completed by Assessor C. C. Gird, makes a highly creditable showing of the growth of Denver and its industrial surroundings in the county. The building improvements show over three million dollars in excess of last year and the city is still making rapid progress:

Personalty	$ 27,277,030
Lots and lands	54,348,305
Improvements	37,296,520
Total, 1907	$118,921,855
Total, 1906	115,052,910
Increase, 1907	$ 3,868,945

The total gross assessment for 1907 is $122,585,925. From this is deducted, in accordance with the constitutional amendment providing for $200 exemption for the head of each family having an assessment of $600 or more, the sum of $3,664,070, leaving a net total of $118,921,855.

A dispatch from Hancock, Colo., a few days ago, stated that despite the pannicky conditions that have prevailed during the past two months, the Consolidated Comstock Company has kept its mine working steadily with a full force of men. Work is being pushed on the big Comstock tunnel, which is in over 1,200 feet. The immense ore body cut at 700 feet is also being developed. It is proved to be over fifty feet wide and is presumed to be the famous Mary Murphy lead, which has yielded many millions.

The Consolidated Comstock Mining Company is harnessing the waters of Chalk creek by building a power plant which is to generate electric power to run a 100-ton concentrating plant soon to be placed on the ground. The power plant is expected to be completed shortly. The mill will then be installed. The property shows sufficient ore to keep the mill busy indefinitely. The enterprise is financed and no stock is being sold.

The slump in the metal market has had but little effect on the properties of this district, as the values are in gold, silver and lead principally. Among them is the Camilla tunnel on Pomeroy mountain, which has produced very rich gold ore.

A statement from Cripple Creek announces that the Jennie Sample company, owning valuable acreage on Raven hill, and practically surrounding the Ophir claim, has decided to block the ground and lease it to responsible parties. There have been a number of mining men, it is claimed, who have been trying to get a lease on the Grace and Specimen fractions, formerly owned by the Grace Gold Company.

These two fractions embrace six acres and lie immediately to the west of the Ophir, and by some it is reported that the celebrated Ophir shoot crosses over into this territory. A shaft has been sunk 500 feet and will require 250 or 300 feet more sinking to reach the desired depth to cut the Ophir shoot, provided it extends into this ground.

There is a report that this small portion of Jennie Sample territory has now been leased to a company composed of Denver men, who will begin work very soon. It is also stated that arrangements have been made whereby work can be done through the Ophir incline shaft, but in view of the fact that there is now a suit pending in the courts between these two companies this is hardly credited.

also stated on what is believed reliable authority that the Raven phir, which is owned exclusively s. Anna Cone of Canon City, is ng as good a grade of ore as er been mined from this famous er. Rumor has it that north incline shaft, just above the level, at a depth of 1,400 feet, iners have broken into a very pocket of some of the richest ver found in the mine. This that it will run $1 a pound or

vein, or rather the shoot, is said ve split, but by putting in a of rounds of shots the fork was ered and the "jewel casket" un- d. Huge pieces of sylvanite are found in the fine screenings, and re clear across the fifteen or y feet will give returns of not han twenty ounces in gold to the

rations are being conducted gh the incline shaft both north outh. The new double-compart- shaft is being sunk as rapidly ssible and it has now attained an ximate depth of 375 feet or a below the seventh level of the e. No work is done on this rty on Sundays and a compara- small force is employed.

property is producing between nd seven cars of ore a week and uality of the ore excels any other in the district, without a doubt. mine will probably net Mrs. this year $75,000, and this, too, e face of heavy expenditures in inking of the shaft, the installa- of new and more powerful ma- ry, legal complications arising an apex suit brought by the Jen- Sample Company and a large nt of development work which been accomplished during the With the ore now in sight the ects for this mine in 1908 are ter than ever before and the in- ons are that the tonnage will be er than ever.

correspondent from Central City, county, states that the closing of the year is noticeable for in- ed shipments on account of the lo- asers making an extra effort to get very pound of ore so that they have extra spending money for olidays. It is also noticeable for everal excellent strikes made in is parts of the county, all of makes company men and leas- eel better over the prospects for coming year. The sampling at Black Hawk have been re- g an increased tonnage during ast two weeks on account of ffort and the grade of the ores has been better than the customary average.

One of the biggest and best strikes of the year has just been made on the property of the Fifty Gold Mines Corporation, which will come as good news to the stockholders of that company, who are located mostly in New York and New England states. After sinking the Cook shaft to the 1,400-foot point, a crosscut was started and after running in about 200 feet, the Bobtail vein has been cut. The vein is about eight feet wide and its exact width is not known, as they have not cut through the entire width at this time. The whole vein matter is pay, showing milling and smelting ores of a uniform and good character, and there is no doubt but that one of the biggest ore bodies in the entire property will soon be opened up.

The record of the Bobtail to date is conservatively placed at $8,000,000, while that of the Gregory is placed at $15,000,000, so that it can be seen that the opening of an ore body on these famous properties is a most important item. Manager O. B. Thompson is now in the East on a business trip but the good news has already been sent to him.

Manager Harry W. Kane of the Hearne Gold and Copper Company, operating the Anchor mine in Russell district, also reports a strike at a depth of 200 feet in that property. A three-foot vein of copper and enargite ore has been opened up, which carries average values of $61 per ton, but the best part of the ore will give values of over $100 per ton, chiefly in copper and silver. Local people who are interested in this find are feeling quite good over their prospects.

Lewis & Son have opened up some fine lead ores in their Pozo mine in Nevada gulch, which also carries some values in zinc. There is a good-sized body of concentrating as well as solid ore for the smelters, and the operators expect to make good shipments within the next week or so. Outside people have been dickering for this property on lease and option for a short time.

As we go to press word comes from Cripple Creek of an important reduction by the United States Refining and Reduction Company, in treatment and transportation rates, amounting to twenty to twenty-five per cent. The statement given out by those in authority reads that on and after December 26, 1907, the following schedule of rates shall go into effect:

Up to one-half ounce, $4.50 freight and treatment.

One-half to three-fourths ounce, $5.00 freight and treatment.

Three-quarters to one ounce, $5.50 freight and treatment.

One to one and a half ounces, $6.00 freight and treatment.

One and a half to two ounces, $7.00 freight and treatment.

Two to three ounces, $8.00 freight and treatment.

Three to five ounces, $8.50 freight and treatment.

F. o. b. car at Denver, Pueblo and Leadville:

Five to seven and a half ounces, $5.50 treatment plus freight.

Seven and a half to ten ounces, $6.50 treatment plus freight.

Ten to twelve and a half ounces, $7.50 treatment plus freight.

It is understood these rates have grown out of the schedule established by the Golden Cycle mill, recently put in operation at Colorado City. Of course, it will greatly stimulate the production of low-grade ores in the Cripple Creek district, and other districts will expect a similar reduction. Competition is the life of business in mining as well as in any other industry.

Bisbee, Arizona

Dec. 21.—During the past week the directors of the Shattuck-Arizona company have been inspecting the property. Not much activity is in evidence in the district, compared with the past few weeks at the smaller properties, the larger enterprises continuing along the same lines as in the past few months. The Superior and Pittsburg company has increased its output by fifty tons daily. The Junction shaft of this company has encountered some very rich ore in a new drift on the 770 level.

The Copper Queen Company is actively engaged in preparing for the use of the new Sacramento shaft when all ore will be hoisted at that property. A new system of taking the ore from the mines to the railroad is being prepared, to which is due the decrease in the November output. The new power house at the Sacramento shaft is being rushed to completion, the 200-foot stack being in course of erection.

The Calumet and Arizona company is paying most of its attention to important development work, and has opened up new property at both the Irish Mag and Oliver shafts. It is expected that as soon as the financial stringency is relieved, shipments to the smelter will be materially increased. The Oliver has installed a new turbine engine of 500 kilowatts power.

Some very high grade copper ore in the Superior & Pittsburg has been encountered on the 770 level of the

Junction mine of this company. The scene of this strike is in virgin ground in a new drift running about 400 feet due west from the shaft. The whole face of the drift is in ore which runs as high as 40% and averages better than 13%. The extent of the ore body is not yet known but is likely to be of some extent. Several feet have been passed through. The second new Prescott crank and flywheel pump has been installed on the 1,000 level. This pump is not a Prescott pump with a Nordberg water-end as mentioned in a previous communication to this publication, but is the product of the Prescott Steam Pump Company of Milwaukee, Wisconsin. It is one of three recently installed by the company. The sulphide drift on the 1,200 level continues to show up well. The shaft is at present in a distance of 1,335 feet, and the 1,300 station will soon be cut. After this station is completed it is probable that the shaft will be sunk to the 1,400 level. The ore shipped from the Junction will average a trifle over 13%. At the Briggs shaft all work has been discontinued, the water being pumped by the Junction. During the past week the shipments from the Superior & Pittsburg properties averaged 600 tons daily, an increase of fifty tons over last week. The water recently encountered in the Hoatson is less than at first anticipated, and as a result work can be more speedily accomplished in the sinking of the shaft. The Cole shaft continues its shipments regularly.

The directors of the Shattuck-Arizona and the Denn-Arizona companies are in the city this week to attend the meeting at which the erection of a smelter will be decided. The directors made a visit to the properties of both companies and later held an informal meeting, the object not made public. In an interview with a representative of this publication, Martin Pattison, president of the Denn-Arizona, stated: "I do not think a smelter will be constructed immediately, as an undertaking of this kind is dependent to a great extent on the condition of the money market, but I will say that a reduction plant is contemplated, and will be constructed at the earliest time that it is convenient." Nothing of importance has been transacted by the directors this week, and it is thought that the formal meeting will be held on Monday."

The Lone Star shaft of the Warren Realty and Development Company has reached a depth of 440 feet. There are no new developments.

The smelters at Douglas continue to operate on about the same plan as in the past few months. At the Copper Queen six furnaces are in commission. The reverberatory is cold this week, as it is being relined. The Calumet & Arizona plant is running the entire number of furnaces. This plant consists of five furnaces, but only four have been operated at one time. The total number of men employed at both smelters is over 1,000. The construction work at both plants is going ahead at a pretty lively speed, especially at the Calumet & Arizona. The Walker casting machine recently installed at the Copper Queen is giving satisfaction in every respect.

The Bisbee Board of Trade received the following communication from Mark A. Smith, delegate to Congress from Arizona, regarding the suspension of assessment work for 1907 and 1908: "I am today in receipt of a memorial from the Bisbee Board of Trade urging that assessment work be remitted for this year and 1908. Kindly inform your body that there is no earthly probability of the passage of such an act at present. No cimmittees have yet been appointed and will not for another week. No bill can pass Congress that has not been referred to and favorably reported on from a committee. It could not receive recognition after being so reported, except by unanimous consent. The opposition to the bill is so pronounced that unanimous consent cannot be expected." The communication was dated Washington, December 11, 1907. This will probably settle the matter, at least pertaining to this year's work.

It is rumored that the Greene-Cananea will erect a new smelter at Del Rio, about ten miles north of Cananea, at a cost of $3,000,000. The plant will be one of the most modern and complete in the world and will require about two years to build it. The power to be used will be electricity and crude oil will be used for fuel for the generation of power. For this purpose the company has been granted a concession by the Mexican government to import oil from the United States free from duty. The location of the smelter will be at the junction of the Cananea-Nogales and Naco-Cananea railroads, and eventually a new city will be built at tnat point. On Tuesday Colonel W. C. Greene and Mayor Arnold of Cananea left for Hermosillo to hold a conference with Governor Luis Torres of Sonora in regard to a reduction of the wage scale it is surmised.

According to advices from Silver City, New Mexico, one of the biggest mining deals ever undertaken in the Burro Mountain mining district is now being consummated. It is understood that the Copper Gulf Development Company will increase their holdings from eighteen claims to over sixty, thereby increasing their acreage to approximately 1,000 acres. The properties to be taken over in the deal include the Iessandro Copper Company, consisting of twenty-eight claims, the Gettysburg group of seventeen claims and six claims in the Leopold-Tyrone Copper Company. As soon as the deal is completed extensive development will be begun by the Copper Gulf Company. E. A. Wayne, the present superintendent of the company, will have charge of the new combination. Mr. Wayne was formerly in a like capacity with the Globe Consolidated. Henry B. Hovland and Hoval A. Smith of Bisbee, who are of the directorate of the company, are supposed to be back of the new enterprise.

H. E. Ellard has been appointed temporary receiver for the Comanche Mining and Smelting Company at Silver City, New Mexico, by Judge Parker, who acted upon a petition presented to him some weeks ago. Mr. Ellard is to act in his new capacity until the creditors can meet and appoint a trustee. It is understood that the assets of the company exceed the liabilities by a great amount, the action being merely a formal proceeding in bankruptcy, as the claims against the company are for a small amount. A reorganization is likely to take place as soon as the affairs of the company are settled. The property of the company is of much value, and their Burro Mountain properties will possibly some day be great copper mines.

Cheyenne, Wyoming

December 24.—The holidays are taking up the attention of our people very largely these days and there is not much doing in the way of outside business. Of course, the coal mines continue their heavy output, but in other departments of mining we do not look for any marked revival until well along toward spring.

Messrs. Iver Johnson and W. H. Kenyon came in a few days ago from the Alkali Butte and Conant creek oil fields, which lie fifteen to twenty miles southeast of Riverton, and reported that these oil fields, comprising several thousand acres are to be developed without unnecessary delay by eastern capital. Mr. Johnson says a half dozen assessment holes have been put down in that section, all of which indicate oil in great abundance and of fine quality.

"In the market development of these new oil fields," continued Mr. Johnson, "a pipe line will doubtless be run to Riverton, thus making this town the center of a great oil shipping industry, with a big labor monthly pay-

roll, which will make Riverton the general payment and practical business and commercial distribution point.

"Further," continued Mr. Johnson, "oil shafts will be soon put down for the purpose of tapping and developing these oil deposits and this entire new oil enterprise, including the Riverton oil pipe line, will be, doubtless in full operation by the midsummer of 1908.

"The Riverton oil pipe line will have a heavy fall from the oil fields to the town and the Northwestern railroad and will be of natural gravity pressure."

Results of the directors' meeting of the Montana-Wyoming Oil & Development Company have just been made public by John D. Losekamp, president of the corporation, says the Cody Enterprise.

It was decided to go ahead with the development work at the field near Garland, Wyoming.

According to reports the 3,000-acre field has three producing wells at present, but it is shipping no oil. The wells are capped and the flow checked. It is the intention to develop more wells as fast as possible and begin to market oil next spring. It is said that the Standard Oil Company has agreed to take all the oil of the fields.

Mr. Losekamp is enthusiastic over the quality of the oil produced and the analysis which he has received from experts shows the oil to be the finest and cheapest in the world.

Mr. Johnson says the initial expenditure in the development of this tributary Riverton oil field will not be less than $50,000, while its cash annual values to the city will eventually run into the hundreds of thousands of dollars.

About ten days ago an important meeting of the heads of the large coal mining companies of the state was held in Cheyenne for the purpose of protesting against their tax levy and if necessary carry the matter into the courts. The Tribune states that the state board of equalization at its spring meeting made a material raise in the valuation of coal properties for assessment, by declining to admit certain expenses of the companies as a part of the cost of the production.

There was talk at that time that the companies would fight the board's ruling in the supreme court, but later the report was circulated that this move was not recommended by the coal companies' attorneys and nothing more was heard of it.

At the meeting in this city, however, at which D. O. Clark of the Union Pacific Coal Company, Thomas Sneddon of the Diamond Coal & Coke Company, the Gridley Brothers of Salt Lake, owners of the Central Coal & Coke Company, were present, the matter of taxation was again discussed at length.

While no authoritative statement has been given out, it is understood that the county courts will be the next battlefield.

The assessment made by the state board of equalization will not be disputed, but the claim will be made that the county tax levy should be reduced.

The present levy in many of the counties has not been reduced from the levy fixed last year, and this, together with the increased valuation of the coal properties, in some counties the most valuable property in the county, will, it is claimed, bring more money into the county than is necessary in the economical, reasonable and proper administration of county affairs or the authorization of public improvements.

The coal companies take the position that they are to be accorded the same rights that are accorded an individual and that they have the same right to kick when the taxes get too high. The claim is made that the county should not assume that because the valuation of the coal properties have been raised, that the county may indulge in public luxuries, but that the tax levy should be kept down between the limits of economical and efficient government.

None of the companies, so far as known, have as yet paid their taxes, which are due, which increased the expectation that they will not be paid except under order of court.

Wyoming is in good shape financially, and the coming year will witness great strides in the development of her metalliferous, coal, oil, irrigation and other resources. The wool crop this year amounted to nearly $8,000,000 and she has turned off a large list of beef cattle and a vast tonnage of coal and other products.

Parral, Chihuahua, Mexico

Dec. 17.—Government authorities claim that $86,500,000 in foreign capital was invested in the republic during the fiscal year 1905-6. According to the latest information compiled by the minister of finance, which appears in the recent issue of the Bulletin of the Department of Fomento, the amount of capital laid out by the United States, France, England and Germany in Mexico during the last fiscal year from 1905 to 1906, that is to say the first year after the monetary reform in Mexico, amounts to $86,500,000, divided as follows:

Banks	$57,600,000
Mortgages	2,000,000
Industry	9,900,000
Mines	7,500,000
Property	3,500,000
Railroads	6,000,000

"This does not include the amount invested in the form of machinery and merchandise or to pay old debts or for the sale of bonds of the federal or state government," says the Bulletin. "The volubility of such amount of capital should be attributed to the prosperous condition of the political economy in Mexico which has endured for a quarter of a century under the government of the great president, Porfirio Diaz. The metallic reserve in the exchequer, on the 19th of July, 1906, amounted t $62,350,142. This amount is in excess of the estimate that the government obtained during the last ten years in spite of the great investments that it made in the public interest.

The production of gold during the last fiscal year amounted to $36,414,444, which is 6½ per cent more than in the year before. Mexico now occupies the sixth place among the countries of the world in the production of gold, and in view of the mines recently opened, it is to be supposed that the production will be increased considerably. The richest gold mine in the world is La Esperanza, situated in the state of Mexico. The company, which was established in 1903, is composed of English capitalists with a capital of £4,550,000. It has paid higher regular dividends than any other mine in the world. The capital stock has all been paid in, so that the shares, the par value of which is £1, now have an actual value of £3. In 1905 more than a million pounds sterling were extracted from this mine with a net profit of £584,643. The mine of El Oro is none the less rich and prosperous, also situated in Mexico, which has a capital of $10,000,000.

"Contrary to the gold production, silver has diminished some three and a half million dollars (75.6 millions against 79.1) and has given 168 million ounces against 171 million in 1905.

"The minister of finance and eminent collaborator of the president, Jose Yves Limantour, attributes this decrease to the fact that the companies have moderated the production, as they considered the quotation of silver pernicious to the production of this metal.

"Concerning the production of copper, Mexico actually occupies the second place. The increase in the production of copper is noticeable and when all the mines are running to full capacity they will equal the production of copper in the United States, and at times the production of silver in Mexico has exceeded that of

the United States. The principal copper mine is the Greene Consolidated Copper Company of Cananea, state of Sonora, with a capital of $20,000,000, gold, half of which has been reimbursed by dividends paid during the last seven years. During the fiscal year of 1905-06 the production of this mine has reached nearly $20,000,000, with a net profit of some $8,000,000.

"Besides the mines mentioned there exist in Mexico very fine lead and zinc mines in the mountainous northern part of the republic. During the last fiscal year the exportation of these metals together with copper has produced $37,000,000."

General Manager J. N. Galbratia, has made a temporary lay-off of quite a large number of men who were building shops and round house in Gomez Palacio. He states that on account of conditions that we all are familiar with at this time in the financial markets of the world, "we let off these men, but the shops will be built at Gomez Palacio, as originally planned. There is only a temporary suspension of work, which will resume again very soon, I hope. But you may say that the shops and round house will certainly be erected in that city."

Asked about general conditions along the system the new general manager said:

"Everything on the Central seems to be moving along smoothly. I think before long people will have no further complaints to make. Today, for instance, Mr. Bucher and I have received reports to the effect that all cars ordered by shippers along the line have been filled up to date, with a few exceptions at Tampico, where the fuel movement is so heavy."

"How about the improvements contemplated, in the matter of laying heavier rails, Mr. Galbratia?" was asked by a reporter.

Mr. Galbratia replied:

"As to that I can state that the entire system will have heavy rails as soon as possible. We now have a shipment of 5,000 tons of seventy-five pound rails at Tampico. These rails will be put down on the Chihuahua division.

"As to the balance of the road, we will get to that in good time.

"I cannot go into details, but you can say that many improvements will be made on the Central railroad system. Some of these are just now being held back on account of the general financial situation, but that is of course only temporary, as we all understand. In fact things generally, to my mind, are looking much better, and picking up right along.

The Department of Fomento has just issued a circular regarding the practice of many applicants for mining titles and concessions of making the denouncements in the names of themselves and other persons vaguely described as "socios" (partners), in which it is directed in future that no applications will be granted except to persons whose names appear in same, signed either by themselves or by their duly accredited representative or attorney.

Phoenix, Arizona

Dec. 22.—Notwithstanding the financial depression, our people appear to be in good shape for the holidays and seem to have plenty of money for the occasion.

A large number of miners have recently been turned out of employment, many of whom have drifted into the towns from the various camps, while others have struck out for pastures new and more inviting fields. We do not look for much industrial improvement until copper jumps up a few points higher and the season becomes more advanced. About all of our leading mining men wear a cheerful look and are confident that the depression will soon blow over without another sirrocco from Wall street or any quarter. As a people, we propose to breast the storm and make the best of it until the clouds roll by.

News from Nogales represent that work on the new Cananea-Nogales railroad is being pushed along as rapidly as men and money can do it. Six large grading camps have been established between Nogales and the Santa Cruz river, and the contractors state that all the grading this side of the river will be completed by March 1. A large rock camp has been established beyond the Santa Cruz which will employ several hundred men. A large warehouse is being built by the Sonora railway at the junction of the new Cananea road and the Sonora, to be used for housing the supplies of the new road. Bridge building and track laying will be commenced at once and closely follow the work of the graders. In the work above referred to over 1,000 men and 900 mules are engaged, which is almost an army.

Tucson.

The Star declares that the injunction granted by Judge F. S. Nave at the late session of the District Court enjoining the Clifton and Morenci mining companies from dumping tailings from their concentrators into the San Francisco river is a more serious matter than is generally recognized, as it will eventually be the means of closing all the concentrators in the district.

The decision handed down by Judge Nave becomes effective about the middle of next year. An appeal was taken to the Supreme Court of the territory and unless a reverse takes place the mining companies will have been dealt a death blow. In bringing this issue the farmers of the valley seem to have forgotten that the mining companies are the very life of this section, and they seem also to forget that notwithstanding the injury they claim to have sustained from the tailings, the price of farming lands along the valley has constantly increased. All the valley papers frequently boast of the excellent crops being raised on the land. It is a fact generally known that the ore bodies in this district are of such a low grade that it is impossible to treat them without concentration.

Over sixty men are at present working on the railroad spur near Lowell, being built to the Sacramento mine. A few days ago work was commenced in filling the old waterway below the dump by using the muck on the huge pile, consisting of thousands of yards of rock.

The spur which is run up to the new power house near the shaft will soon be extended to the shaft. This will also be finished by spring as will the other work.

Many of the men who have been let out of the mines have found work on the railroads that are now being built in the territory, while hundreds have found employment in the Mexican mines, railroad building and other departments of industry.

Word from Globe reaches here that the money obstacles have been removed and work on the oil well of the Hot Springs Company, in the artesian belt south of Safford, will be rushed from now on out.

Dorn Morris, manager of the company, and Mr. Grant, head of the drilling department, attended a meeting of the stockholders held in this city Thursday night and were in a position to make such a favorable report that funds were readily subscribed for a completion of the test well, which is now down nearly 1,500 feet and completely cased.

Reno, Nevada

Dec. 24.—The last reports from the three men entombed in the Alpha shaft of the Giroux Mining Company, 1,000 feet beneath the surface, was they were in hopes to get out by Christmas and be able to see how the world looks on the outside. They are supplied with food, air and the news of the day by a pipe line extending from their enforced subterranean abode to the surface. R. A. Bailey, one of the entombed, stated to a White Pine

News representative the other day that they were a little lonesome but otherwise feeling fine.

"We know that the men on top are doing all they can for us and we are confident that it will be any great length of time before we shall see daylight again. We are in absolutely no danger here. The men on top are working far worse position than is ours. Pete McDonald and Fred Brown want their friends to know that they are comfortable and safe as we know all are worried about us. We have everything that we want. We even have cots, which we have made from the small timbers and the packing from the pump pipe.

"How does it feel to be stuck away down in a hole like this? Well, I can't say that I feel any difference, now that I am entombed, from the times when I was working in any ordinary place, where all I had to do was to give the signal and be hoisted to the top. Of course, we were pretty badly frightened, all three of us, for a few hours after the accident, but since we have been in communication with our friends neither of us has felt the slightest uneasiness. We are in absolutely no danger. The only possible thing which could harm us is rising water and on the 1,000 foot level we are about twelve feet above the water level of the shaft."

While the men underground are expectantly awaiting for their release, at the surface their friends are hoping and praying that it will be soon. Besides their friends, R. A. Bailey, pumpman, aged thirty-five, has a wife and two small children who long for him. Pete McDonald, aged twenty years, is anxiously waited for by a brother who is employed at the shaft and is bending every effort to aid early release. Fred Brown, aged forty, while unmarried, has many friends who will be glad to take him by the hand when he steps forth a free man. While their friends wait for them, there are others who mourn for C. W. Turner, alias "Slim" aged thirty-two and for his companion, Mike Constanti, aged twenty-two, who were first injured and then suffocated by the dust of the cave-in on the day of the accident. Both of these men were unmarried. Clad in the knowledge that the three men who are alive will ultimately be brought to the surface, joy is not unmixed with sorrow caused by the fate of their two companions.

It was expected that lifting of muck from the shaft would commence Monday night, but this was rendered impossible and it was only at 6 o'clock yesterday morning that the immense hole caused by the cave-in was filled sufficiently to allow this work to be thought of. J. A. Gallagher of the Veteran shaft of the Cumberland Ely, stated that this morning about 10 o'clock, no unforeseen accidents interfering, would see the first carload of muck brought to the surface. He realizes that the men below are safe, he said, and is taking no chances which would endanger the lives of the working force.

The mine owners of Goldfield state that at least $1,300,000 worth of high grade ore has been stolen by the high graders of that camp in the last three years. They stand in with a certain class of disreputable assayers and divide the spoils. Rigid rules are being adopted by the mine operators to nip the thieves in the bud. A committee has been organized to investigate the matter and suggest means to catch the thieves and send them to prison.

On his return to San Francisco from Goldfield, General Funston gave out the following statement: "I have always thought and still think that Governor Sparks, under the conditions which he knew existed in Goldfield for some time, was justified in fearing that a crisis would arise during the present strife that the sheriff, even if so disposed, would be unable to meet.

"It is true that there had been during the present strife no rioting, but the materials for a first-class riot were on hand and the local authorities were exceedingly weak. It is a case of action before lives had been lost.

"I found on my arrival in Goldfield that the community was largely in a state of terror, based more on occurrences in previous strifes than in anything that had happened in the present one. I felt that the fears of many were somewhat exaggerated, but they knew their neighbors and I did not. It was genuine terror all right without going into the question as to whether it was well founded or not.

"Subsequent talks with members of the Western Federation of Miners gave me confidence that the withdrawal of the troops would not be followed with violence, and it was on this point that I modified my views of the situation.

"As to attempts to deceive me I believe that the mine owners and miners told me what they regarded as facts. Their views as to the conditions were naturally divergent, but I believe, honestly so."

Up to this writing affairs in Goldfield are in statu quo, and the cool headed believe there will be no further trouble. Men are being brought in to take the places of those who refuse to return to work under the new schedule. Union pickets still guard the mines and watch the incoming strains, but thus far no violence has been attempted.

President Slosson of the Yellow Jacket Mining Company says in his weekly report that on the 1,100-foot level they have a gold ledge varying from ten to eighteen feet in width, which assays $3.41 to $14.62 in gold to the ton, and justifies the 100 stamp the company put up at Gold Hill a short time ago. "The existance of the green gold ledge," says Mr. Slosson, "was not generally known to the publis, nor by the shareholders, but it is of great prospective value, owing to its extent and continuity.

"It extends downward as far as the 3,000-foot level, and some of it was extracted from the 14,000-foot level and sent to the Carson river mills.

"Owing to the milling charges of $7, railroad freight, and the high cost of steam power for hoisting, it was impossible to make a profit, but with the new Yellow Jacket mill on the ground, no freight to pay, and with electric power, we can make a good profit."

This is the mine in which Clarence Mackay is said to have acquired a controlling interest lately, and it is claimed that his money was the fund that stood for the erection of the new mill.

The formation at Park City, Utah, consists of sedimentary beds cut by intrusive dikes. The ore occurs near the contact of the limestone and quartzite layers, in large, irregular deposits.

A British thermal unit is the quantity of heat required to raise the temperature of one pound of water 1° F. at the temperature of maximum density, 39.1° F. It is commonly referred to as B. T. U.

Some millmen object to grizzlies on the ground that they choke too readily. However, if the space between the bars at the lower end be made wider than at the upper, the clogging may be materially reduced.

A cyanide solution must be aerated to produce good results. The oxygen is necessary to the reactions taking place, and when the solution lacks the necessary oxygen it is described as "dead" by some cyanide men.

The production of spelter in the United States in 1906 was 199,694 tons, of which 130,348 tons was produced by Missouri. Colorado was next with 32,456 tons, followed by New Jersey with a production of about 11,000 tons.

Movements in Mining Camps of World

Only Authenticated Reports Will Be Admitted to These Columns

ARIZONA

Cochise County.—In the new shaft on the group of the Arizona and Michigan company at Johnson, a ledge the full width of the shaft containing a two-foot vein that runs as high as $300 in gold and silver, besides being almost solid sulphide, has been discovered and samples sent to Benson.—The Copper Queen company has begun to pay one-fourth of its wages in cash.—On the property of Henry Valenzuela, in the Benson district, a blind ledge of copper six feet wide has been encountered in the tunnel closely resembling the high grade ore from the Copper Queen.—The Tombstone Consolidated Mining company has penetrated the new ore body in the Emerald mine, which is fifty feet below the water level in the other part of the mine, for a distance of over thirty feet without reaching the opposite wall. The ore is of a black sulphide and carried good values in lead and silver besides the values in copper that will run as high as 20 per cent. A drift that had been started in close proximity of the winze has also shown up some of the same class of ore, three feet of it having been encountered so far. The opening up of this body of ore in the Emerald has already led to the company making plans for the installation of a new hoist and the sinking of a new shaft on the property. The company will regin work shortly in rebuilding the Lucky Guss hoist that burnt downed and will remove the machinery from the Tough Nut shaft to that site, where it will be installed.—The Lone Star shaft of the Warren Realty and Development company has reached a depth of 427 feet, 206 of which has been timbered.

The Calumet and Arizona is now running the maximum number of furnaces, but only four have ever been operated at one time. For nearly two months only three were in operation. At the Copper Queen smelter six furnaces continue in commission and the product last month was something more than one million pounds to each furnace, making the total about one-third of the average product for the first six months of this year.—A cave-in in the Hoatson shaft of the Superior & Pittsburg Copper Company caused the death of "Dock" Sale. The deceased was a young man about 23 years of age, and a native of Urbana, Illinois.

Gila County.— The new electric hoist has been installed in the winze at the sixteenth level of the Old Dominion at Globe. The sulphide vein has been exposed for about fifteen feet but the rich ore has not been yet reached.—The Miami Copper Company a Lewishon company formed to take over the Alsdorf property which the company has been developing for the past year, has been formed.—The Arizona Commercial at Globe has begun the payment of its wages in currency.—The Shannon Copper Company is continuing operations on about the same scale that was in force before the company began to feel the effects of the drop in copper prices. Advantage is being taken of the depressed conditions to improve the smelter.—Between seventy-five and 100 additional men are reported to have been employed at the Old Dominion.

Graham County.—Although curtailing working forces on account of the copper situation, the New England and Clifton Copper Company is making heavy shipments from the Antietam mines to the Shannon smelter.—It is announced that Mr. James Colquhon has resigned as president and general he was an active agent of the company. For nearly twenty-five years he was an active agent o fthe company.—The C. & A. company, which has numerous claims in the Pima district, are working sixty men at different camps in the section and have made some very important developments in the main shaft of the Armogosa, its chief claim in the district.—Men are also being worked night and day in three shifts by the Mineral Hill Consolidated people and the lower workings of this company's new developments are all in good ore.—C. J. Cunningham of Tucson is also working quite a number of men on different claims of his on the Pima district and is in good ore on the lower levels.—The Chesterfield is working about fifteen men and three shifts are kept in the main shaft which has by now reached a depth of 150 feet. This main shaft will be sunk to a depth of 200 feet, when drifting to the north and south will begin, at which time ore will be taken out for shipment. At the present time about fifteen tons of ore are being taken out daily. On the dump there is about seventy-five tons of first class ore, running from $40 to $60 per ton, and some 150 tons of second class ore of lower value.

Mohave County.—It is said that ore from the Treasurer Hill mine taken from the north drift of the present level assays about 400 ounces silver to the ton.—Ore running above $40 to the ton in gold has been struck in the 800-foot level of the Gold Road mine, the vein being seven feet wide and showing considerable free gold.

Pinal County.—Active work is being conducted in the Copper creek section and large tonnages are piling up on the various dumps. Progress on the American Eagle claim is advancing with excellent results.—The Imperial Copper Compay, which is employing between 350 and 400 men in the mines at Silver Bell and on the smelter work at Sasco, expects to blow in the new plant which is to have a capacity of 350 tons, before the first of January and all the ores of the company will be treated there.

Santa Cruz County.—There are about forty men at work on the old Cero Colorado mine in Arizona district, under the supervision of Charles Udall. The shaft is now down 400 feet and will be sunk to 500, when crosscutting will be done. The present hoisting machinery is too light and new and heavier machinery has been ordered.

Yavapai County.—The new thirty-ton Nissen mill of the Mount Tritle Copper Company in the State creek section is reported as finished and ready for operation.—The Boston and Jerome company is working a full force with favorable indications.—At the Arkansas & Arizona sinking continues at the rate of about three feet a day, in a broken formation carrying iron and here and there a trace of gold.

Yuma County.—The discovery of a rich body of mineral, which has been designated the "Gracias" group, was made about the middle of November by H. C. Johnson, an assayer of Kofa, and brother of O. C. Johnson. It is located ten miles northeast of Kofa, on the trail to Quartzite, past Hall's lead camp and the North Star group. It is claimed that the ledge is from twenty-five to thirty feet in width and is traceable for a distance of 200 feet. A number of parallel ledges containing the same character of ore, were also discovered. Assays of many samples from the main ledge show values ranging from $55 to $930, the richest sample being taken from an eighteen-inch streak. Assays of the parallel veins run as high as $124 to the ton.—The Quartz King Mining Company, which is developing a cop-

per property on the Colorado river, near Parker, with thirty-five men, is owned by Swedish capitalists, among whom the late King Oscar is said to have been a heavy stockholder.

CALIFORNIA

Alpine County—Fred Kustler, J. Krummer and associates of Sacramento are inspecting their property located near the Hercules dam below Loope where they have been working for some time and a tunnel has been run for a distance of 125 feet to tap the main ledge which gives surface assays of from $3 to $9 in free milling rock. As soon as the ledge is reached a shaft will be sunk to a depth of 100 feet and then the ledge will be cross-cutted on that level. If the values hold good at that depth, a mill will be erected on the river and near the mine next summer.

Butte County—According to the latest official bulletin of the California Mining bureau, Butte county has surpassed Nevada county in gold production for the year 1906.

Calaveras County—Owing to the mine operators at Angel's Camp insisting that the men work a full eight-hour day without reduction from the company's time for any purpose, the miners at the Lightner have gone on a strike, alleging that the action is against the terms of the contract.

Fresno County.—Associated well No. 5 of the Associated Oil Company in the south field of the Coalinga oil district has started flowing 150 barrels a day, although the casing has not been landed, and is therefore expected to yield 600 barrels. Intense excitement is manifested in the district and all indications point to an oil stampede as drillers with strings and crews are rapidly coming in and making locations.

Inyo County.—Good progress in development and marked improvement in the ore bodies in the Casa Diablo mine leads the management to believe that the payment of dividends will be begun at an early date. Sufficient ore has been opened up to keep the mill running for several years.—Considerable work is reported at the Schwab and Clark properties, but operations have been practically suspended at all other mines. The financial depression will keep the Greenwater holdings idle for many months.—A twenty-horse-power hoist has been installed at the Happy Jack, forty miles from Shelton, where the shaft is going down at the rate of three feet a day in ore that gains value with depth. As soon as the shaft is finished crosscuts will be cut at different points with a large force of men employed.

San Bernardino County.—A large ledge of copper has been struck near Cima by William Smith and Jack Adams, who have located several claims. The largest of the veins is four feet wide with smaller ones in evidence. Besides copper, tungsten indications are to be seen.

Shasta County.—The new mammoth smelter at Kennett, California, with a capacity of 2,000 tons per day, will be in partial operation December 15th and in full operation by the middle of January.

CANADA

British Columbia.—Forty men have applied for employment under the new wage scale at the Granby company and twenty were employed cleaning up around the works. Feelings are more hopeful that the difficulties will be shortly settled.—In the annual meeting of the Carney Copper Company, held at Mullan, Idaho, December 3d, the report showed that during the year No. 2 tunnel had been driven for a distance of 710 feet, and it is expected that from 200 to 250 feet more of work will be done before the ore shoot is reached, which should be some time in February or March. A glory hole 40x50 feet was opened up and a car of ore taken out and sacked ready for shipment when the market is more favorable.—G. G. S. Lindsey, president of the Crow's Nest Coal Company, has said he intends closing the coke oven at Michel, which employs 500 men, due to the closing of Boundary smelters.—The work of finishing up the steel flue dust chamber at the Granby smelter, as well as of the extensive additions to the coke and ore bins, is going steadily along under contract, and should be completed in a few weeks more.—It is understood to be the intention of the Yale Mining Company, operating the Nickel Plate mine at Hedley, to return to the old scale of wages in force some months ago, being about 50 cents per day under the present wage scale. The company has given the union thirty days' notice of the reduction, under the terms of the Lemieux Act, passed at the last session at Ottawa.—The Riverside mine, under bond to Sater and Johns, of Greenwood, and located a few miles from Rock creek, has made a twenty-ton shipment to the Trail smelter.—Supplies have been taken to the Independent mine, Bear Creek section, in the Similkameen, to last all winter, and the force of five men under Foreman Johnson do not expect to get out much till spring.

COLORADO

Boulder County.—The work of setting poles, stringing wires and installing electrical apparatus for the 300-horse-power plant of the Black Cloud mill is being rapidly pushed by Boulder contractors. There will a sub-station at Salina to distribute power to other points. By use of transformers the capacity may be increased to 1,000 horse-power if needed.—The new cyanide mill designed by Hendrie & Bolthoff for the Taylor Gold Mining Company is nearing completion at Magnolia. In addition to the milling operations a three-drill Blaisdel compressor is being erected at the mill, and a tunnel started directly in front of the ore bins, which is to be driven about five hundred feet on the vein to connect with the shaft, and the ore will be hoisted from the various levels to the tunnel level and sent to the mill in cars.—Mr. Charles A. LaPoint, a former resident and merchant of Eldora, Boulder county, and an experienced placer miner, has just perfected an invention for saving free gold in placer ground and mills.—The old Slide mine on Left Hhand, belonging to Senator Teller, has shipped its first car of ore since the shaft house was burned a year ago.—The Alton tunnel in the Nederland district, now in the mountain 1,100 feet, will be driven another 1,000 feet after which a mill will be erected for the treating of the tungsten ores.—The schedule of the Phillip Bauer mill, situated on the Rogers, shows a forty per cent. deduction of values for loss.—The Denver Mines Company, of which Elwood Dunn is manager, is contemplating the purchase and equipment of a mill to handle its own and custom ore.—The Consolidated Copper Company, operating the Fourth of July mines at Eldora, will put up a reduction plant in the beginning of the year.—Denver parties, of which A. E. Stahler is the head, have secured the old Coburn mill, up Middle Boulder creek near the foot of Magnolia hill, and are preparing to install machinery for the reduction of tungsten ore from the mines tributary to this section.—Leasers on the Logan at Sugar Loaf are shipping a car a week of high grade ore to Denver smelters. The average values per ton of 4,500 tons of ore from the Logan was $118.84.—The Golden Message Company is sinking the Addison shaft from the 100-foot level in a large vein of good mill ore, seamed with high grade.—The people who are back of the Highland Mary Mining and Milling Company, a corporation operating above Eldora, are this winter arranging the details for the construction of

a power plant which will generate about 1,000 horse-power from the waters of Middle Boulder creek.—Work has been resumed on the Tennessee, situated between the American and the TiHie Butzel at Sunshine.—The power plant of the Swarthmore Consolidated Mining Company at Eldora is working to perfection, and the Enterprise tunnel is being pushed ahead vigorously.

Chaffee County.—The Salida Barrie Granite Company, newly incorporated with a capital of $500,000 is formed for the purpose of quarrying, transporting, cutting, polishing and finishing granite for monumental, building and all other purposes, the building of tram or railway lines, etc.—The Waverly Mining Company started work forepart of the week on their group of nine claims at Winfield. A large amount of ore has been shipped from the property, the shipments showing an average value of $65 per ton.—A plant of machinery is being installed on the Boma at Whitehorn. It consists of a sixty horse-power boiler, a six by eight hoist and a pump. The shaft of the Boma is 150 feet deep. A six-inch streak of ore good for nine ounces gold shows in the bottom.

Clear Creek County.—The new aerial tram of the Santiago mine has been completed and will bé in operation this week. It is 4,000 feet long and runs from the mine to the Argentine Central railway at Wilcox tunnel. ing, Milling and Tunnel will soon be in operation. The building is completed, the crushing and grinding machinery installed, and much of the shafting is in place.—The Kelly mill is being run on ores from their Moline adit. A surface tram 350 feet long and on a pitch of forty degrees has just been completed between the adit and mill.—The Rockford and Lucania tunnels will resume active operations. The Donaldson mine has just been taken over by the Rockford company.—The company operating the Capital tunnel could not get a suitable place for its mill and is forced to install an engine in the top of the mill to pull the cars to necessary elevation.—A shipment of ten tons, termed second class from the Riley lease on the Sunburst has been delivered at the Santiago sampler and ran 168 ounces silver and twelve per cent. lead to the ton. M. J. Riley, the lessee has refused a cash offer of $6,000 for a half interest in his privileges. The streak now measures over seven feet across without reaching the footwall. Three different experts who have examined the ground state that a production of at least $250,000 should be made from this block of ground which is 300 feet in length by 128 feet in height.—G. A. Huffman, who has charge of the Smuggler mine, has returned from the East and intends pushing work on the property. Two shifts of drill men will commence drifting on the fourth level west, and all parts of the mine will be the scene of much activity in the near future.—Jacobs and Miller have broken into eight inches of ore that assays 743 ounces silver and one ounce gold to the ton in one end of their stope. In the opposite end of the stope they have about eighteen inches of zinc and copper.—The Glendale and Treasure Vault mines in the Peru district, are again undergoing development by the owners, Ernest LeNeve Foster of Denver.

Gilpin County.—The East Boston G. M. Company, recently incorporated in Denver by Boston parties, will commence work on the East Boston and Rialto mines, which have been idle for two years, at Central City.—Work on the Topeka mine will be started in the middle of January.—Jack Lyng, John Hawn and Kraemer and company, leasing in the San Juan tunnel, now driven over 1,000 feet in the Nevada district, are making regular shipments to the Buell and Hidden Treasure mills.—The Jefferson-Calhoun Mining Company is shipping steadily from the Jefferson and Calhoun shafts. On the West Calhoun a big strike was made, the smelting ore averaging $120 to the ton and the mill dirt running as high as twenty ounces.—The Fifty Company in driving the 1,400-foot level from the Cook to the Bobtail struck the Bobtail vein. The vein seems to be of large width as it has been driven into seven feet and not penetrated.—In the Anchor mine, operated by the Hearne Gold and Copper Company, a three-foot streak of smelting ore has been opened up, which runs over $60 to the ton.

Gunnison County.—The Brant Independent Mining Company will install an electric plant on Quartz creek which will be capable of generating 4,000 horse-power to be used as a substitute for steam in the Quartz creek mill, the building of a 1,000-foot flume being already under way. The power will be used to furnish the adjacent towns and mines with light and electricity and also to operate the company's machinery. The Brant mill has been shut down owing to the necessity of making repairs.—A three-year bond and lease contract has been recorded running to Dan C. Tobin of Leadville from the American Smelting Company of Leadville to the Eureka-Nest Egg lodes at White Pine.—New air drills are working on the Forest Queen at Irwin and that mine is steadily making shipments of rich silver ore.—A thousand tons a day is still the production of Crested Butte coal mines in spite of the fact that the big fuel company has shut down.

Hinsdale County.—An option on the Newport property on Engineer mountain has been given to George B. Duke of Paonia by Hoffman & Zacharias The consideration is said to have been $4,000.—A committee appointed by the Hinsdale Mining and Publicity Association has made arangements whereby local miners and prospectors may have a market for small lots of ore. Mendenhall & Co. shipped a carload of ore to the smelter at Salida, from their lease on the Sulphurette.—Mr. Foster Baker, who has a lease on the Silver Fleece mine, is taking out some fine gray copper ore.

Lake County.—It is reported that work on properties in the down town district of Leadville has entirely ceased.—The Leadville Exploration and Mining Company, capitalized at a million dollars, presided over by Governor Myron T. Herrick of Ohio, has taken over a group of claims consisting of the Elk, Donovan, Deer Tenderfoot, Antelope and other claims lying east of the Ibex, all of which have been idle for some time. The company will reach the ground through the Yak tunnel, although it is the intention to develop the upper workings through the old shafts.—It was learned that work has already commenced in the Yak tunnel for the purpose of crossing the Ibex ground and getting into the territory beyond.—The timbering of the Forepaugh shaft has been so damaged by the fire which destroyed the surface plant, that the lessee, F. Cretney, will enter the ground through other workings.—The Penn lease, producing 200 tons of oxidized iron a day, the Louisville Mining Company, operating through the Yak tunnel, and the Langiola Mining Company, controlling the R. A. M. property on Iron hill, will all continue active development.—Ore sampling four ounces gold and nine per cent. copper has been encountered in the shaft on the Eagle group in Big English gulch.—The Arkansas Valley smelter is at present running practically all its furnaces, and consignments of mineral have shown little falling off.

Mineral County.—Work on the Happy Thought mine and tunnel has been ordered to cease by the company, and after the ore on hand has been treated at the mill, the plant will be shut down till a rise in the price of lead, zinc and silver.—A new company, composed of New York capitalists, with a capital stock of $2,000,000, has been organized to operate the Cor-

mately increased to 1,000 tons capacity.

Humboldt County.—The Seven Troughs Kindergarten Company, which owns the famous Kindergarten mine in Seven Troughs canyon, will begin the construction of its proposed stamp mill about the first of the year. The mill will be of forty tons capacity, with ten stamps dropping and a gasoline engine will be installed with sufficient horse-power to operate forty stamps if desired.—The Bard lease on the Brown Palace has been resumed. Bard and Mund, who have several leases in Seven Troughs, as well as a lease on the White Alps in Rosebud, have resumed operations on their lease on the Brown Palace, which was closed down last fall, and are working two shifts from the bottom of their shaft to cut the Brown Palace high grade about seventy-five feet from the workings. Seven sacks of this ore went over $1,000.—T. McLean is at present closing a deal on the Iron Man group of five claims, consisting of the Iron Man Nos. 1, 2, 3, 4 and 5. Eastern parties have taken these claims over at a substantial figure. He stated that the latest news from there by R. Knight, who came into that camp recently with a sample of nickel and cobalt which went over sixty per cent. in both metals, and there is a ledge some five or six feet in width traceable for a considerable distance of the same kind of ore nearly all the way.—A new strike is reported as having been made by one of the leasers on the Storey-Nelson ground in Gold Circle and in a shaft twenty feet deep there is a three-inch streak of ore that will run $15 to the pound. The entire shaft is in ore of a high grade character.—The Dunscomb-Gabbert property is being thoroughly prospected by the three men on the ground, and thus far an eight-inch streak has been struck on the hanging wall of a fourteen-foot ledge that assays from $500 to $1,000. This vein can be traced for a long distance and into the two Mac's ground. —On account of the stringency of the money market and the general panicky conditions that now exist over the entire country, the Vernon Mining Company, operating at Vernon and Velvet, has closed down its workings for a short time.

Lincoln County.—The Shandoa Bells Mining Company has added to its holdings in Eldorado canyon by taking in another group of eight claims, making in all twenty-eight claims, or 500 acres, owned by this company. The assessment work is about completed, and the working shaft is down sixty-five feet. A new road has been built which shortens the distance from Searchlight several miles.—The Nevada-Utah is now shipping from the Day mine at Jack Rabbit a car load of ore daily. Two shifts will be maintained in sinking the vertical shaft, which is destined to cut the Wild Rose vein at a depth of 100 feet.

Nye County.—The Lemon mill and the Wolf mill in the Manhattan district have been completed and placed in running order.—The machinery of the Chapman mill has arrived and is being put in place. When the three mills are running Manhattan will be crushing, at a low estimate, ninety tons of ore a day.—A pay streak of ore one foot wide was found on the hanging wall of the Thanksgiving mine lately, from which ore sample assayed ran $47,008.90 in gold and $333.52 in silver to the ton. This pay streak is a part of a four-foot vein from which average samples were taken across a vein, aside from the very rich streak, and the returns were $167.96 per ton in gold and silver.—On the McAllister lease on the Tip Top there is eight feet of ore which goes $67 per ton. The Rose-Nash lease and the adjoining leases are still taking out the high grade ore and they are holding it until they can get it into the mill. On lease No. 1 of the Stray Dog, Dan McNamara and Smith are sacking ore that goes $300 a ton.—Lester Giffin has about completed the installation of the dry washer upon the lease on the Golden Gate property.

The Spanish Belt Mining Company, organized for 1,000,000 shares under the laws of Nevada, has taken over ten claims of the Ogden Nevada Mining Company, situated adjacent to the old Barcelona mine in the Spanish Belt district, the consideration being stock in the new company.—The Nevada Smelter and Mines Corporation has installed a Snow station pump, on the 400-foot level, and a third 100-horse power boiler and a six-drill Ingersoll compressor at its mine at Tybo.—The Mammoth Mining Company, operating a property near the Gold Bullfrog, reports a good flow of water in the shaft at a depth of fifty feet. The miners are hoisting about ten buckets a day.—The quarterly report of the Tonopah Extension Mining Company has been received by local shareholders in the company. During the quarter a total of 1,853,860 tons of ore has been shipped to the smelter. The receipts for ores shipped during the month of October, as far as received, amounted to $34,477.04, and there is $29,773.06 now due for ores shipped.

Ormsby County.—W. C. Green and D. C. Smith of Oregon have bonded four mining claims in the Delaware district from James Howard and J. W. Bradbury of Carson, for the sum of $25,000. Under the terms of the agreement the purchasers are given about eighteen months to make full payment for the property. The purchasers also agree to work at least thirty-five shifts of men on the property during the first sixty days and to work fifty shifts of men every month thereafter.

Storey County.—The Wolverine Mining Company, owning fourteen claims in Unionville on the east slope of the Humboldt mountains, and fourteen claims in White Horse canyon, where it has a tunnel advanced 500 feet in milling ore, will erect a mill which may be operated by either water or electric power. J. M. Sweeny is general manager.—Pill Williams in the same district is preparing to erect a mill.—The owners of the Emma L. mine immediately below the Wolverine are preparing to install a ten-stamp mill.—B. F. Snow of the Fern Cliff mine has taken up a water right along the stream.

White Pine County.—The closing down of the United States smelters and the terms offered by the American Smelting and Refining people in accepting shipments of ore are largely responsible, claims Mr. Wallace, for the present inactivity of the camp of Cherry Creek.

NEW MEXICO

Grant County.—McCarthy and Company, operating on the Slasher claim, adjoining the Mother lode, the property of the Bessemer Iron and Copper Company at Fierro, have encountered a small but rich vein of red oxide and copper glance in a crevice five feet wide at the twenty-three-foot depth.—On the southwest side of the Burros, a rancher named Brock, has partially developed six claims, producing from thirty tons at an average value of $50 a ton and netting a substantial profit over and above all expenses. Modern hoisting machinery and a compressor of scientific pattern have been ordered and on their installation the claims will receive systematic development.—The output and shipments of iron by the Colorado Fuel and Iron Company from July 1, 1907, to December 1, 1907, aggregates 86,500 tons, and if cars can be had the output for December will be 17,000 tons additional, making a total of 103,500 tons for the past six months.—The tunnel shaft on the National Copper Company's group is now 200 feet in depth. A station is being cut, and as soon as finished a crosscut will be driven.

Otero County.—Regular shipments of from two to three cars a week are

being made from the Delusion mine in the Orogrande district. The ore runs from four to six per cent. in copper and from $2 to $4 in gold, and is steadily growing better as depth is reached. —The property was opened up only some two months ago by a tunnel.—The First National Company has made a shipment from the Ruby where the tunnel is in between thirty and forty feet, and assays run as high as $65 to the ton, the general average being somewhat less. At the Forest Queen of the same company a shaft has been started on a vein showing a surface width of twenty-five feet. The First National is arranging to install a good placer plant.—Two cars of high-grade matte have been shipped to Chrome, New Jersey by the Orogrande smelter which will henceforward make regular shipments. The greater part of the ore being smelted is from the properties of the Southwest company, who own the smelter. This ore comes from the Nannie Baird, the Lucky and the Bychance. Outside of the properties of the company the Delusion and the Providence have so far been the largest shippers. Both these properties are being operated by E. D. Baker.—The Texas Jarilla Mining Company, successors to the Electric Mining Company, have their 100-ton placer plant almost completed, and announce that they will start within a few days. —The three-compartment shaft on the Monte Carló towards the north end of the range, is now down more than 300 feet on a silver-galena vein. A new crosscut vein is reported to have been struck, with excellent indications.

Socorro County.—A rich strike of ore is reported at the 160-foot level of the Top mine at Mogollon, where the work of sinking is being rapidly carried on with up-to-date machinery. The Sullivan compressor which was broken, has been repaired by an agent of the company.

SOUTH DAKOTA

Custer County.—The Saginaw Mining Company of the Custer district has completed its building operations and installed its new hoist, which is capable of sinking 1,000 feet, over the main working shaft now at the 300-foot point, where five quartz ledges from four to eight feet in width bear good gold values. The new seventy-five ton amalgamating, concentrating and cyaniding mill will commence to operate as soon as the ore is delivered. —The ten mica trimming machines which were recently installed in the trimming and culling department by the Westinghouse Electric & Manufacturing Company are now running in full blast. The splitting department will be reopened just as soon as sufficient help can be procured. The company is also making preparations to resume work on its No. 2 mica mine, better known as the "White Spar."

Lawrence County.—Work has been resumed at the Puritan mine, in Strawberry gulch which was abandoned a year ago at the seventy-five-foot depth. The work is under the management of John McGoffin for Kansas City parties.—At a meeting in Elgin of 200 stockholders of the Homestake Extension and New England Homestake companies of Deadwood, the two companies were reorganized and consolidated with a capital stock of $5,000,000. Work in the Extension tunnel will be continued and the New England shaft will be sunk to the required depth. At the meeting it was further decided to commence criminal action against Douglas, Lacy & Company of New York, the former fiscal agents of the companies and certain former officers, for embezzlement of the funds amounting to $49,000.—Ringley and partners, leasing on the ground of the Iron Hill company, where the main shaft is down 400 feet and the permanent water line is at the 200-foot level, have encountered a large and strong vertical from which high-grade shipments will be soon made.—It is stated that the Anaconda Mining Company, owning 400 acres of mining ground on the divide on Elk creek, near Roubaix, with a large plant of mining machinery installed, will resume work on the shaft, now down 200 feet, and crosscut both ways with a force of ten men employed.—The mill building of the American Eagle Mining Company is ready to receive the machinery now on the way.—The assay office of the Gilt Edge-Maid company near Galena, has been totally destroyed by fire, the loss incurred to the company being $2,000 with no insurance.—Five mining claims comprising the Cannon Ball Nos. 1, 2 and 3, owned by George Pollard, have been transferred to the Globe Mining Company for a substantial sum. It is expected that the mill on the property will be ready to run by Christmas, and the prospects are exceedingly good that it will continue in operation for a long time.

Pennington County.—The Holy Terror company has closed down its workings in the Keystone district, pending improvement in the financial situation. The United Mines Company, which has a bond on the property, intends to move the fifteen stamps from the Holy Terror mill to the Keystone plant which now has twenty stamps.—The Golden Slipper shaft which is an incline down 300 feet, is about to be worked and the five-stamp mill to be put in running order.—The Mainstay Mining Company is putting in a water system from Pine Creek and from Grizzly gulch, each about five miles distant from the mines.—The mill is supplied with thirty stamps, with full equipment and has a cyanide annex that has ample capacity for the treatment of tailings. The working shaft is down 400 feet and on the 200 there has been opened up a forty-foot ledge of milling ore that is ready for stoping.—J. C. Corcker, superintendent of the J. R. Mining Company, near Hill City, is now in the east and as soon as he returns, the plant will be put in operation. The shaft which is 250 feet deep, is now full of water.—The Continental Copper Company, formerly the Dakota-Calumet, has reached a depth of 500 feet in their main shaft and will not proceed with the sinking until the new hoist, now being turned out by the Downie-Wright company is installed.

MEXICO

Aguascalientes. — Carlos Meislahn, mining promoter, has concluded the sale of the Paso de Sotos tin mines in the western part of the state, owned formerly by W. A. Pratt, the assayer, to the American and Mexican Mines Company, who will begin work on the property on the second of January.

Chihuahua.—The production of Parral for the week ending December 14th was 6,950 tons, of which 2,950 were shipped to the smelters and 1,400 locally treated.—The Granadena Mining Company of Santa Barbara has purchased for cash fifty pertinencias consisting of the San Luis, Demasias de San Luis, Demasias de San Luis No. 2, Demasias de Cuba Libre, Maturtina and Maximo-Gomez, six properties in all, adjoining the Granadena properties on the north. The fifty pertenencias were bought of J. F. Johnston and Luis Tinoco of Parral.—The federal district at Ciudad Juarez has delivered a decision in the famous Dolores mine case at Santa Eulalia, denying ampara to J. P. Hutchinson who was dispossessed some months ago by a decision of the second civil judge in this city. The case is one of the utmost interest to mining men everywhere with interests here and it will be taken at once to the supreme court at Mexico City.—On the afternoon of December 9th two explosions occurred in the plant of the Compania Mettalurgica de Torreon, owing to a mishap in the blowers, and engine and furnace rooms were totally demolished. On December 14th a trial run was made and all five furnaces are now running full capacity, repairs be-

ing expedited by the fact that none of the furnaces were allowed to freeze.—Drilling has commenced by the Hearst-Keene syndicate on its third oil well near Ojanaga near the Rio Grande in eastern Chihuahua. This well is on lands of Governor Creel.

Durango.—A tunnel is being driven toward the Cabrillas mine of the Cabrillas district, where rich ore has been struck and will be shipped to the smelters.—The Voladora Mining Company has shipped a carload of ore from one of its shafts at Saltillo, where good ore was encountered.—Another dividend of $5 per share has been declared by the San Juan Mining Company of Mipimi, Durango. This is the twelfth regular dividend paid by the company.

Guanajuato.—An option has been taken on the San Cayetano Providencia y Anexas in the Guanajuato camp by an American company which will, on closing the deal erect a large mill on the property.—The Guanajuato Reduction and Mining Company has added an additional eighty stamps to its mill, and is now operating 160 stamps. The eighty stamps of the Guanajuato Consolidated are running night and day. It is the intention of the Guanajuato Development Company to increase the construction force now working upon the Mineral Belt railroad, and at a very early date this construction will be rushed to completion.—Othon Durstewit has asked a concession of four pertenencias for a mine of silver and gold, situated in the district of La Luz. This claim adjoins the rich mine of San Nicolas del Jaral and Los Yanquees.—Elisha C. Moore has filed on a mining claim of four pertenencias in the district of Santa Ana.—Frances Drivet has filed on five pertenencias to exploit for silver and gold in the mineral district of La Fragua.

Jalisco.—The Casados Mining Company, owning ninety pertinencias in the Hostipaquilo district, while unwatering the principal old workings encountered a bonanza streak in the bottom of the mines of which much of the ore runs from 15,000 to 20,000 grams silver, or from $660 to $880, to the ton. The remainder of the ore ranges from 2,000 to 10,000 grams.—Patrick Fitzgerald, general manager of the Santo Domingo Mining Company, has denounced twelve pertenencias for two separate additions to the group of claims owned by that company. One is for eight pertenencias adjoining the Consuelo claim and the other is for four pertenencias adjoining Mono.—W. R. Ramsdell of Guadalajara, president of the Casados and Tenamache Mining Companies and vice president of the El Favor Mining Company, has purchased a controlling interest in the Expectativa Mining Company of this city. The company owns the Expectativa mines ten miles southwest of Ameca.—It is stated that a party of American investors will arrive in Guadalajara the first of February on a trip of inspection to the properties of the Tajo Mining Company, situated in the San Sebastian district of this state.

Mexico.—A. G. Baldwin, formerly of Los Angeles, Cal., has established in Mexico City a large plant for the manufacture of zinc shavings for use in cyanide works.—It is reported that a vein varying from five to eighty meters wide and running above two kilos silver and twenty-eight grams gold, has been encountered at the Dos Rios mine about twenty-five kilometers from Mexico City.—Governor Creel has granted the El Rayo Mining and Development Company a ten years' exemption from state and municipal taxation on smelter and reduction works of 100 tons daily minimum capacity to be erected at Los Azules, Santa Barbara municipality.—La Protectora y Anexas has resumed shipping on a small scale of the high grade ores, of which a considerable tonnage have been blocked out during the last two months.

Nuevo Leon.—Zinc mining in the Monterey district and northern Mexico is reported practically at a standstill owing to the low prices of that metal. Few companies are in operation and those doing any development are holding ores for a rise in values.—The stockholders of the Norias de Bajan Mining Company at a meeting in Monterey are discussing the question of doubling the capital stock to provide funds for enlarging operations.

Oaxaca.—Owing to the refusal of the Teziutlan smelter to take further shipments of ore for some time, the Consolidated Metals Company has ordered a temporary suspension of ore buying at Oaxaca and other localities.—At a meeting of the Oaxaca Exploration Company it was unanimously decided to liquidate, because of the non-payment of assessments, due to the stringent money market.—Reports from Ocotlan and Ejutla is to the effect that mining activity is decreasing rapidly in those districts, and that many people are emigrating, especially Americans. Several mines have already suspended their work and others are working only a very reduced number of men.

Sonora.—Colonel W. C. Greene states that fifty men are employed at Cananea.—According to Thomas MacManus, representative of Colonel W. C. Greene, work will be resumed in a short time at Cananea, on a new basis. The reorganization has not been effected as yet.—It is learned that the Greene Consolidated Copper Company has decided to erect a new plant for the economical treatment of its ores at Del Rio, the junction of the Cananea-Nogales road with the Naco-Cananea branch.—The old Mejia mines of Ygnacio Pasqueira, situated eighteen miles west of Sonora have been sold to Los Angeles parties.—The Cienguita Copper Company is employing over 500 men at its mines in the Sierra Madres, where it has over five miles of underground workings. Two furnaces are in full blast and are busily making matte which is averaging values in the neighborhood of $1,500 every twenty-four hours. These will value from $700 to $800 a ton and is perhaps the richest in that entire section. It assays fifty per cent. copper, from 550 to 560 ounces silver and three to four ounces of gold.—The Tomlinson & Norton Mines Company, operating near Cinoquipa, has struck a four-foot body of ore from which fifteen samples showed an average value of $630 a ton, mainly in silver. A large plant of machinery is being installed at the Lluvia de Cobre mine in the Hermosillo district.—The new cyanide plant at the mine of the Roy Consolidated Company in the Nacozari district is now in successful operation.—The Los Angeles mine sent a carload of copper and silver ore to the smelter during the past week. The owners of this property are planning for building a small smelter on the property.

Tamaulipas.—The low price of copper has finally caused the San Carlos Copper Company, which has been one of the best paying propositions in northern Mexico, to close down their San Jose mines at San Jose. The force of 600 men working in these was notified on December 1st that the number would gradually be decreased until the works were closed.

About 50% of the sulphur used in the United States comes from pyrites ores.

Turquoise is mined in several parts of the Southwest. The grade, however, is not the equal of the higher priced imported gems. A large percentage of the turquoise now produced comes from Mohave county, Arizona.

There is one part of the United States that has never been prospected. It is in the northeast corner of Arizona and is known as the Big Bend country. Its virginity is due to the absence of water and the roughness of the topography. Years ago cattle rustlers are said to have found rich gold specimens along its borders.

Personal

W. C. Renshaw, of the Gem mines, Idaho Springs, Colorado, is in Denver.

A. H. Ristedt of Idaho Springs is again in Denver, Colorado, for a few days.

W. L. Shaffer, of the W. L. Shaffer Assaying Company, of Idaho Springs, Colorado, is in Denver.

Col. L. W. Powell of the Calumet & Arizona, left Bisbee for Los Angeles today, to be absent a short time.

Dr. L. D. Ricketts of the Greene-Cananea, passed through Bisbee on his return to Cananea from Globe.

W. H. Covey, who is operating several leases in the Leadville district, paid Denver a snort visit this week.

Mr. Merralls, of the Merralls Iron Works Company of Denver, is in San Francisco on a two weeks' business trip.

Manager Walter Douglas of the Copper Queen has returned to Bisbee from the East, after an absence of some time.

John H. Talbot of the Calumet & Arizona returned to Bisbee this week from the company's mines at Leadville, Arizona.

Frederick H. Minard, M. E., of Denver, left last week for a few weeks' visit in New York. He was accompanied by his wife.

Arthur Winslow, of Boston, Massachusetts, eastern manager of the Liberty Bell Mining Company, visited the mine at Telluride recently.

Marshall D. Draper of Winapan, Mexico, is spending the holidays in Denver. Mr. Draper has been connected with the American Exploitation Company for several years.

S. R. Porter has resigned as superintendent of the Gold Roads Mining and Power Company, near Kingman, Arizona, and will be succeeded by H. G. Heffron, the assistant manager.

C. L. Colburn was in Breckenridge, Summit county, last week, as mining expert in the trial of the King Solomon Mining Company vs. the Mary Nevin Company, whose properties are located near Frisco in that county.

H. J. Karns, M.E. of Nogales, Arizona paid this office a visit last week. Mr. Karns will spend two weeks in Denver, buying equipment for a 50-ton mill on his La Mejia property. He has already purchased a battery of Merral stamps and Pierce amalgamator.

Prof. W. F. M. Goss, who has been professor of mechanical engineering at Purdue University, has been appointed Dean of the College of Engineering and the new School of Railway Administration at the University of Illinois.

Having sold the Big Sandy Coal and Coke Company, the general offices for Jewett, Bigelow & Brooks Collieries Company, Twin Branch Mining Company, Maher Coal and Coke Company, will be at Twin Branch, West Virginia. Mr. J. W. Bigelow's personal address will be at Hensely, West Virginia.

Prof. L. W. Trumbull, who has had charge of the department of geology and mining at the University of Wyoming, has tendered his resignation from that university to accept the supervision of mining properties in Sierra county, California. His present address is Downeyville, California.

Thomas Thorburn, secretary of the anthracite department of the State Y. M. C. A., and Joseph G. Saricks, one of the field secretaries, entered business together on November 1st. They will devote their attention to the contract mining of coal and other phases of that industry. Their headquarters will be in Wilkesbarre, Pennsylvania.

Lee Tomlin of Oklahoma City, Oklahoma, has recently located in Denver. He will probably make Denver his permanent home, or some other town in the state. He says Oklahoma is a magnificent state and her people are proud of their statehood, having recently been admitted into the union. The Oklahoma legislature is now in session. Mr. Tomlin is here for the health of his family.

Clyde T. Griswold, E. M., has just entered upon his duties as professor of mining and metallurgy at Colorado College. He succeeds Dr. Thomas T. Read, who accepts the position of professor of metallurgy at the Imperial University in Tientsin, China. Professor Griswold is a graduate of Amherst College and of Columbia University, and was connected for some time with the Canadian Copper Company. Before coming to Colorado College he was superintendent of the Crean Hill mine at Victoria, Ontario, acting as superintendent of construction on their new smelter rearrangements and additions.

Obituary

A. J. Terry of Cheyenne, a pioneer of Wyoming, died in Chico, Calif., of Pneumonia, on the 20th inst. He settled in Wyoming in 1868 and was sixty-three years of age at the time of his death. Mr. Perry is survived by the wife and nine children. The remains were returned to Cheyenne for burial.

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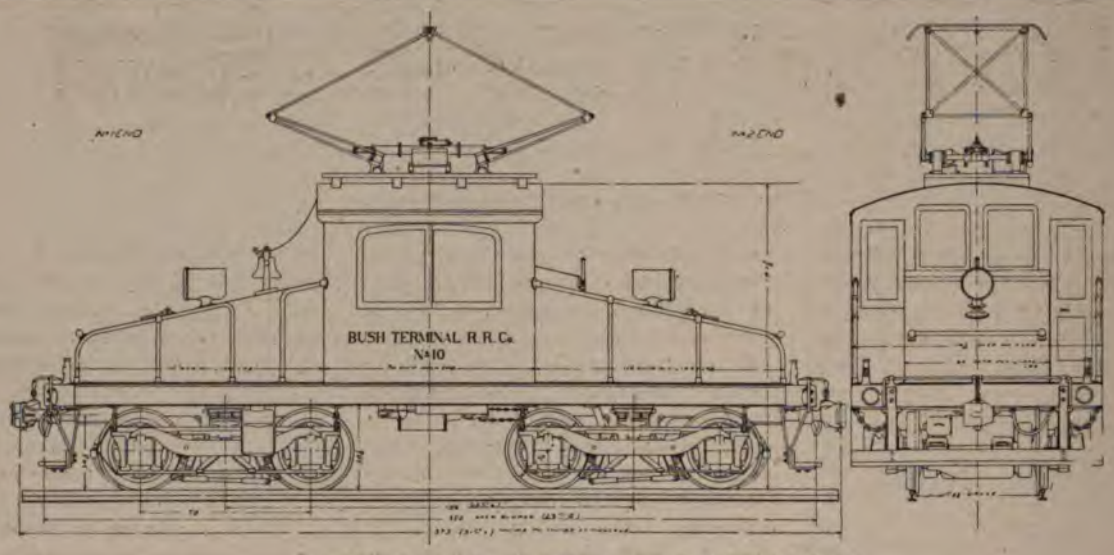
Captain W. F. Kavanaugh, formerly a well-known newspaper man of Leadville, Aspen, Cripple Creek and other Colorado towns, died at the Soldiers' Home in Leavenworth, Kansas, on the 13th inst. He was sixty-seven years of age, a Mason in good standing and has a brother, James Kavanaugh, living in Leadville, and a sister in Denver. Deceased was also a member of the Cripple Creek Press Club.

George A. Hall, a well-known and prosperous ranchman and cattle raiser, was killed in a runaway accident last week about seven miles from Canon City. Mr. Hall was fifty-six years of age and was born in Perry county, Ohio, but had resided in Colorado since 1884. He was a member of the Canon City camp of the Woodmen of the World, and was buried under the direction of that order. He is survived by the widow, two children and a brother, J. W. Hall, who resides in South Canon City.

Colonel H. R. Holbrook, one of Pueblo's wealthiest and most distinguished citizens, and a pioneer of Colorado, died at St. Mary's hospital Thursday of paralysis. He was found unconscious in his room Monday and had been stricken with paralysis during the night, having laid on the floor without attendance for many hours. Colonel Holbrook was a director of the Mercantile National Bank of Pueblo and was financially interested in many banks in Colorado. He was president of the Laguna Coal Company and was also interested in many other enterprises.

MACHINERY AND EQUIPMENT

Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.



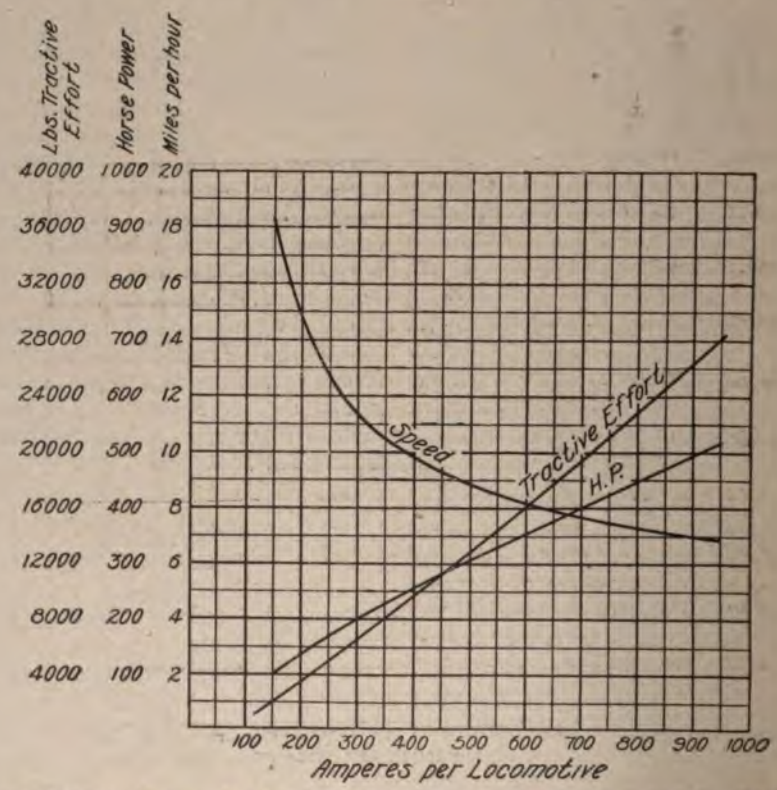
Forty-Ton Electric Locomotive, General Outline.

ELECTRIC HAULAGE.

Just as the electric motor car has replaced the horse car, cable car, compressed air motor and other forms of locomotion in self-propelled street cars, so in the near future will it supplant the use of horse, mule or man motive power in the mines and metallurgical plants of the country. There are some advantages of electric haulage which it might be well to mention here. In no other systems of locomotion can this power be so readily concentrated and in this way furnish the means of relieving any congestion of traffic, all of which tends toward the maintenance of better scheduled time. The cleanliness and lack of odors resulting from the use of electric power are especially desirable in mine work, where the conditions of the atmosphere is so necessary to the efficient work of the men. The ready control of the car is another feature of importance, as anyone can testify who has tried to stop or direct the action of a horse or mule underground. Absolute control of a mine locomotive may often prevent a disastrous collision.

There is no question of the efficiency of the electric motor, but the expense of changing from steam and other systems to electric has retarded what would otherwise have been an economical, beneficial change. Greater speed may also be obtained, thus increasing the tonnage capacity and earning power per mile of track.

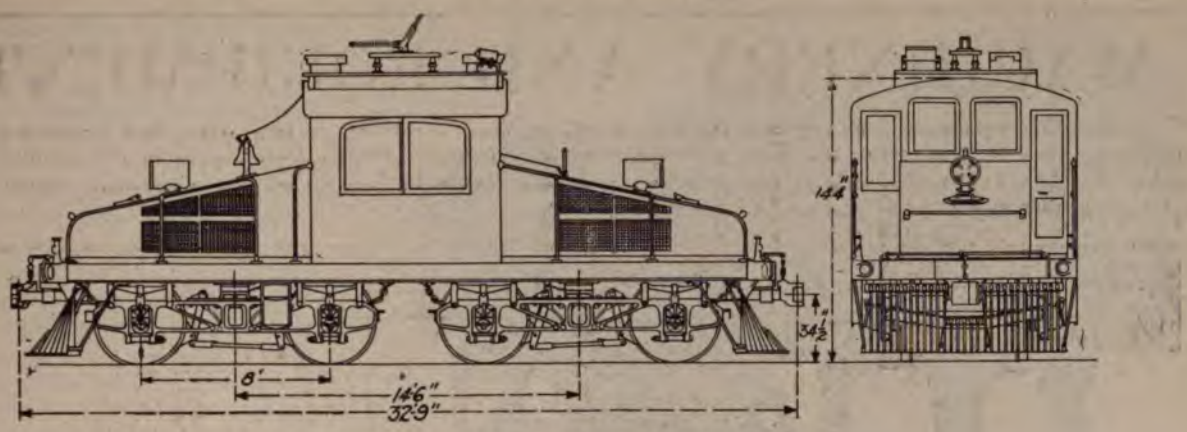
Diagrams of two designs of electric locomotives made by the General Electric Company are shown in the accompanying cuts, together with the characteristic curves for each. These locomotives are made for freight service, and show the general design of the lighter General Electric types.



Characteristic Curves for Forty-ton Locomotive Equipped with four GE-55-geared motors.

THE HANCOCK JIG.

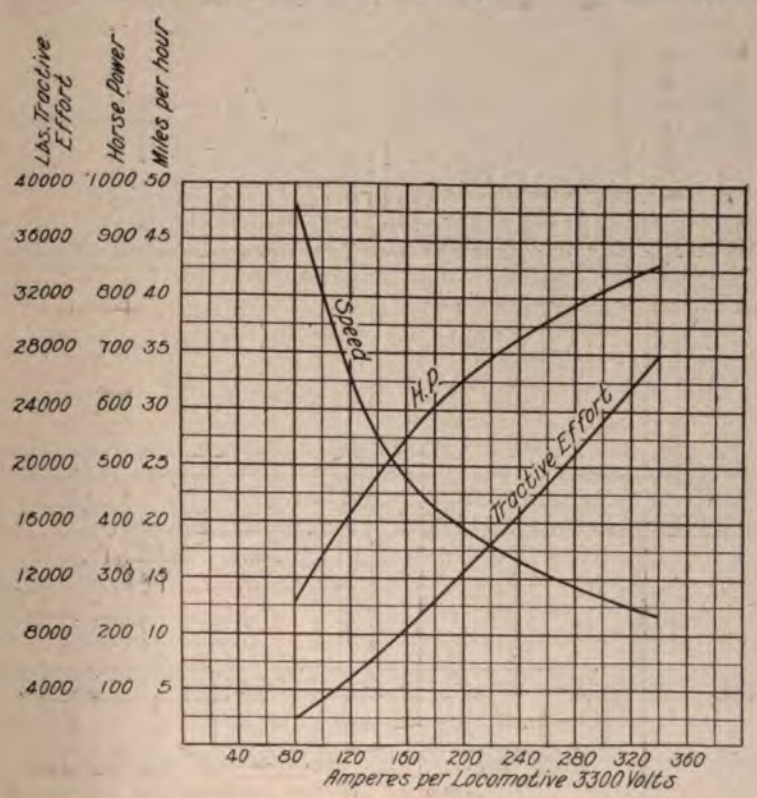
The metallurgy industry of the United States is in debt to Australia for many suggestions and some of the best machinery now being used in this country. By this it is not meant that Australia has done more to develop



50-Ton Electric Locomotive, General Outline.

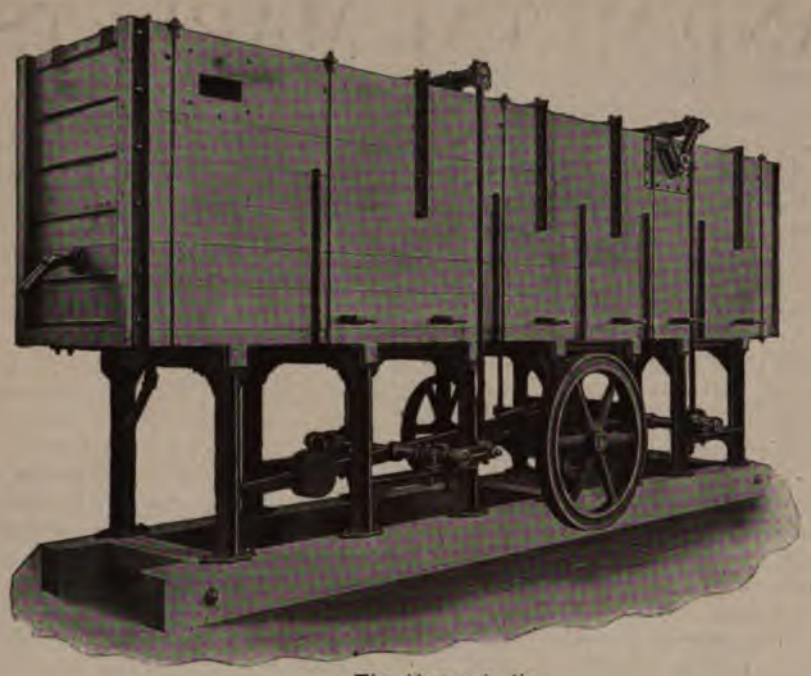
metallurgical machinery than America, but through the call of necessity the men of her mining industry have constructed mechanical devices to fit their needs, and these have been found so useful that they were finally introduced into the United States. The machinery originating in Australia has often been made for the extraction of ores at a particular mine, with no thought of introducing it outside of one district; that is, such inventions are the direct outcome of mine managers in their efficient management of mines, while our inventions are introduced for the monetary gain to the inventor. Of these two incentives the last probably does more for the industry, because it immediately brings the product before the public. The characteristics of American improvements is apt to be based on theory, while the Australian machinery will show applications of practical mechanics. This difference is due to the fact that the large mining machinery houses of the United States have a staff of engineers designing new types, most of which are the result of inspiration, not necessity. As an illustration of this statement, the invention of a new concentrating table, and the unique design of a new copper furnace by engineers for two large machinery houses might be mentioned. In support of the other statement, the origin of the Hancock jig might be given.

This jig was invented by Mr. H. R. Hancock, then general manager of the Moonta mines in South Australia. These mines had large bodies of low grade copper ores, which could not be profitably worked until Mr. Hancock devised his jig to meet the conditions. Because of their success there Mr. Hancock was induced to erect an experimental plant in the Broken Hill, New South Wales, where they gave excellent results on low grade "lead silver" and "zinc blende" ores. Although the box of this jig is somewhat different from the usual forms, yet the most noticeable feature is the placing of the driving below instead of above the box. The most important feature of the jig is its large capacity, due to the shape and size of the box and the movement of the screen. The box is approximately twenty-five feet long, four feet and two inches wide and five feet and nine inches high, and is a rectangular prism divided below the screen into six compartments. Inside the box and submerged is a screen or sieve twenty feet long by two feet eight inches in width, which is divided by cross pieces into about fifty pockets. This screen is fastened to two cast steel bars running crosswise above the box (see fig..). These bars are connected by four upright arms (two on each side,) to the rocking arms shafts below, which in turn are connected to levers, whose ends are actuated by a three-way cam on the main driving shaft (see fig.) This main drive shaft revolves at a speed of sixty to sixty-five revolutions per minute, thus causing three times as many reciprocations of the screen, or 180 to 195 per minute. The motion of the screen is an upward and forward movement, with a downward and backward movement on the return, the downward movement being caused by gravity, while the backward movement is produced by radial bar, whose groove guides the screen backward. Each motion can be regulated to suit the ore being treated. The average up and down displacement is three eighths of an inch.



Characteristic Curves for 50-Ton Locomotive Equipped With Four GEA-609 Geared Motors.

In operation, the fine material in the feed is taken down through the screen into the hutch at once. The finest



The Hancock Jig.

mesh screen that the jig uses is over the first hutch compartment. The coarser part of the feed forms a bed for this fine concentrate, while the medium sized concentrate passes on to the next hutch compartment, and the coarse concentrates to the third compartment. In the last part of the jig, commencing where the coarse concentrates come down, the screens consist of plates punched one-eighth of an inch larger than the size of the largest material the jig is handling. In this section of the jig, artificial rogging, such as round iron punchings, hematite or other properly-sized, heavy material, is used as a bed. Each hutch is provided with its own independent water supply, so that its action can be regulated as to the kind of material which is taken down into the hutch, and also as to the cleanness of the concentrates. This only applies, however, to the coarse concentrates compartment; the close bed over the fine concentrate compartments prevent any sand from going down there. In the first section of the jig the action of the hydraulic classification carries along the fine sands, while the coarse concentrates are being taken down into the hutch. The last two hutches are usually used for middlings, as practically all the free mineral in the feed is taken down in the first three compartments.

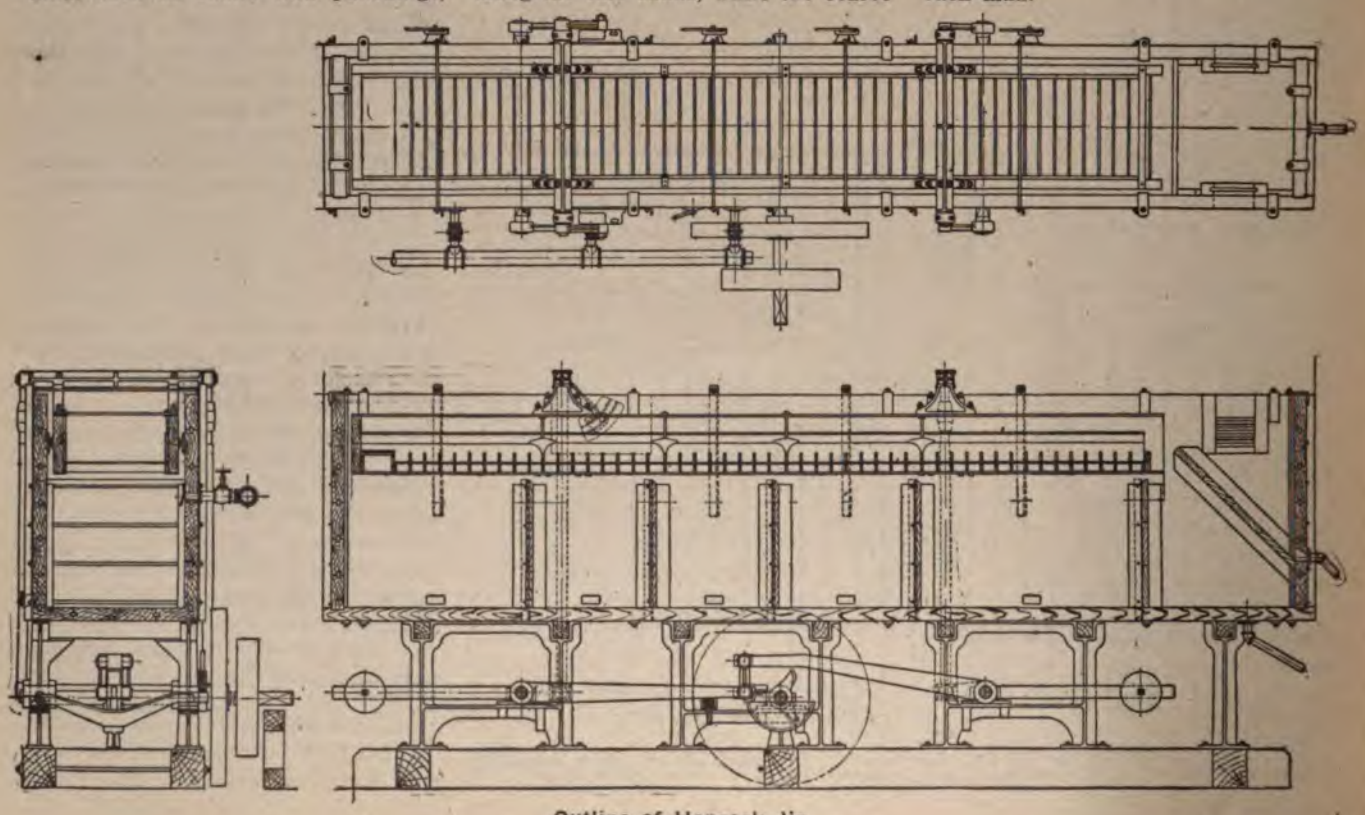
Each hutch compartment has an opening on the side at the bottom where the hutch products are drawn out. The capacity of the jig runs from 500 to 700 tons per day. Of its advantages, the large capacity obtained in proportion to the floor space and power used, and its ability to handle an unsized feed are the most important. The lack of sizing does away with the usual number of trommel screens and makes the construction of a mill less complexed. In Arizona, the jig has given great satisfaction on copper ores, owing to its capacity, simplicty of construction and saving of labor.

The rocks of the Cœur d'Alene are thought to be of the Algonkian age, although no fossils have been found in them.

The power developed by a downward load on a gravity aerial tram at Bingham Canon, is used in hoisting coal, etc., to the boiler room.

Marble has the chemical composition of limestones, but has been changed or metamorphosed by heat and stress into a crystalline substance.

In ventilation at least 100 cubic feet of fresh air should be supplied for each man.



Outline of Hancock Jig.

THE STOCK AND METAL MARKETS

Colorado Springs

Dec. 26.—Following are the quotations at the close of the exchange today:

	Bid.
Acacia	05½
Black Bell	....
C. C. Cons	03½
C. K. & N.	05
Dante	05½
Dr.-Jack Pot	05½
Elkton	46½
El Paso	27½
Fanny Raw	05
Gold Sovereign	03½
Gold Dollar	05
Isabella	23½
Jack Pot	03½
Lexington	01½
Mary Cashen	....
M. McKinney	30
Mollie Gibson	....
M'n.-Anchor	01⅜
Old Gold	02¼
Pharmacist	02⅝
Portland	95
Prince Albert	0075
Vindicator	75
Work	14
Unlisted.	
Golden Cycle	40
Jennie Sample	....
Jerry Johnson	05
Un. Gold Mines	04½
Prospects.	
Anchor	....
Banner	01¼
Blue Bell	02
Bob Lee	005
Buckhorn	0075
Cr. & C. C.	....
Des Moines	006
Gold Bond	01
Gould	....
Hart	....
Ida May	01
Jolly Jane	0075
Keystone	....
Little Bessie	....
Little Nell	01
Little Puck	01
Mary Nevin	01½
Missouri	005
Mtn. Beauty	05
National	0075
New Haven	0055
Pilgrim Cons	01
Princess	005
Requa Savage	02¾
Republic	006
Robert Burns	....
Rose Maud	01⅝
Rose Nicol	....
St. Thomas	01
Teutonic	01¾
Miscellaneous.	
C. Gold Camp	....
Flower of West	0055
Lucrative	0025
Red Spruce	002
Texas Girl	004

New York

Dec. 26.—This week's quotations below show substantial gains over last week. Amalgamated Copper gained several points as did American Smelting, Colo. Fuel & Iron, General Electric and U. S. Steel.

This is an indication of better things in the commodity they represent, and if the steady gains increase all stocks will be back to normal soon.

The report of the U. S. Steel Corporation will be made public in a few months. It is expected that the new plant at Gary, Ind., will soon be ready to turn out steel.

The company acquired this year the Tennessee Coal & Iron Company, National Wire Corporation, Hostetter Coke Company and minor other properties, by a slight increase only in fixed charges, these charges in turn being more than offset by the earnings of the concerns acquired.

It is interesting to note that the preferred dividend and interest obligations of the Steel Corporation are slightly less today than they were at time of organization. This in the face of the fact that when the new works now under construction are completed the Steel Corporation will show an increase in its capacity of close to 100 per cent.

It is estimated that the Steel Corporation increased its productive capacity this year by 10 per cent.

Cash on hand will show a very large increase and the same can be said of working capital.

Expenditures for extraordinary replacements and ordinary repairs will run close to $50,000,000.

Inventory valuations will approximate $110,000,000.

Average number of employes will exceed 200,000.

Exports of steel will run in excess of 1,000,000 tons

Highest wage ·y year since organization, and . gest pay roll.

Following are th. .ations:

Stocks.	Close.
Amalgamated Copper	45⅛
American Smelting	71
American Smelting, pfd	90
Colo. Fuel & Iron	18½
Anaconda Copper	28
Republic Steel	16
U. S. Steel	25½
U. S. Steel, pfd	86⅞
General Electric	108¾
Utah Copper	17½
National Lead	39

Curb Quotations.

Stocks.	Bid.
Arizona Commercial	13
Ahmeek	45
Black Mountain	4⅛
Cumberland Ely	5¾
Davis-Daly	5¾
Ely Cons. Copper	⅞
East Butte	4
Furnace Creek	....
Giroux	2½
Globe Cons. Copper	6
Greene Cananea Copper	5⅞
King Edward	¾
Keweenaw	5
Mitchell	½
Nevada Utah	2½
Nevada Cons.	7¾
Nipissing	6
Superior & Pittsburg	8⅞
Tintic	2¾
Utah Apex	2½
Dom. Cop.	1¾
B. & L.	75
Majestic	95
Carisa	20
Mont Sho.	4⅜

Boston

Dec. 26.—The Boston & Montana Copper Company, the only subsidiary of the Amalgamated Copper Company in operation, is now producing about five-sevenths of its normal output. In other words, its production is now running at the rate of about 65,000,000 pounds a year.

It is stated that a large number of workmen, thrown idle by the closing of the Washoe smelter and the Amalgamated Copper Company, have been transferred to the Great Falls smelter.

There is very little change in the copper situation. Buying continues very light, but producers say consumers would readily enter the market if they were able to procure necessary funds. A better idea as to the outlook for 1908 can be obtained in January of next year.

Following are the quotations:

Stocks.	Bid.
Adventure	2¼
Arcadian	3½
Allouez	25
Atlantic	8
Bingham	4½
Boston Con.	9½
Balaklala	1⅞
Butte Coalition	15
Calumet & Hecla	590
Calumet & Arizona	95
Centennial	23
Copper Range	55
Daly-West	8
Franklin	7½
Granby	....
Isle Royale	17
La Salle	10½
Mass.	2¾
Michigan	8¼
Mohawk	44
North Butte	40¼
Old Dominion	27½
Osceola	80
Parrot	9
Quincy	75
Shannon	9⅜
Tamarack	64
Trinity	14
United Copper	7
U. S. Smelting	30
do pfd	35
Utah Cons.	29¼
Victoria	4⅜
Winona	4
Wyandot	60
Wolverine	111*

Nevada

(Furnished over the private wire of O. L. Malo & Company, 221-223 Boston Bldg., Denver, Colo.)

San Francisco, Cal., Dec. 26.—Following were the closing quotations on the exchange today:

Comstock.

Stock.	Bid.
Ophir	1.15
Mexican	25
Gould & Curry	....
Cons. Virginia	52
Savage	35
Hale & Norcross	40
Yellow Jacket	1.65
Confidence	41
Sierra Nevada	37
Exchequer	....
Union	24

Tonopah.

Stocks.	Bid.
Tonopah of Nevada	5.25
Montana Tonopah	1.80
Tonopah Extension	....
MacNamara	16
Midway	53
Tonopah Belmont	....
Tonopah North Star	08
Ohio Tonopah	02
West End Cons.	32
Rescue	04
Tonopah & California	02
Golden Anchor	02
Jim Butler	40
Cash Boy	....

Monarch Pittsburg Ext.	01
Montana Midway Ext.	01
Golden Crown.	....

Goldfield.

Stocks.	Bid.
Sandstorm.	20
Columbia Mountain.	17
Jumbo Extension.	58
Vernal.	05
Pennsylvania.	....
Kendall.	11
Booth.	19
Blue Bull.	17
Adams.	06
Silver Pick.	27
Nevada Boy.	02
Black Butte Extension	03
Blue Bell.	....
Dixie.	04
Goldfield Columbia.	08
Hibernia.	03
St. Ives.	44
Conqueror.	04
Black Rock.	02
Lone Star.	09
Goldfield Wonder.	....
Oro.	08
Kendall Extension.	....
Sandstorm Extension.	03
Mayne.	02
Atlanta.	29
Great Bend.	28
Simmerone.	03
Empire.	....
Red Top Extension	12
Florence.	3.85
Diamondfield B. B. Cons.	17
Goldfield Daisy.	90
Combination Fraction.	74
Great Bend Extension	03
Milltown.	....
Black Butte Bonanza.	02
Kewanos.	24
Esmeralda.	01
Portland.	07
Crackerjack	07
Red Hills	31
Mohawk Extension	....
Lou Dillon.	04
Yellow Tiger.	11
Grandma.	07
Silver Pick Extension.	....
Yellow Rose.	....
Columbia Mountain Ext.	....
Diamondfield Triangle	07
Coming Nation.	02

Bullfrog.

Original.	03
Bullfrog Mining.	05
Montana Bullfrog.	01
National Bank	10
Lige Harris	....
Amethyst.	08
Gold Bar.	37
Denver Bullfrog Annex.	03
Bonnie Clare.	10
Mayflower Cons.	14
Montgom'y-Shoshone Ext.	02
Golden Sceptre.	02
Montgomery Mountain	03
Bullfrog Diamondfield	03
Homestake Cons.	....
Yankee Girl.	01
Nugget	03
Tramp Cons	18
Banner.	01
Sunset	02

Manhattan.

Manhattan M. Co.	02
Manhattan Cons.	02
Gold Wedge.	03
Seyler-Humphrey.	02
Dexter.	05
Little Joe	01
Crescent	01
Combination	01
Mustang.	10
Little Grey	05
Cowboy.	01
Original Manhattan	....
Broncho	02
Pinenut.	03
Buffalo.	01
Stray Dog	09
Yellow Horse.	....
Indian Camp	04

Other Districts.

Fairview Silver King	....
Fairview Eagle	35
Nevada Hills	3.00
Pittsburg Silver Peak.	1.20
North Star Wonder	02
Eagle's Nest.	23

METALS.

New York, Dec. 26.—Lead firm, $3.50@3.60. Lake copper quiet, 13⅜@13½. Silver, 52¾.

St. Louis, Dec. 26.—Lead higher, $3.50. Spelter higher, $4.15 bid.

Salt Lake City

Dec. 26.—Following are the closing quotations on the exchange today:

*Stocks.	Bid.
Alice.	....
Ajax.	20
Butler-Liberal.	02
Bullion-Beck.	85
Beck Tunnel.	51
Black Jack.	21
Colorado.	2.17½
Carisa.	17½
Columbus Cons.	1.99½
Cons. Mercus.	20
Daly Mining.	....
Daly-West.	....
Daly-Judge.	3.50
Eagle and Blue Bell.	1.00
Grand Central.	2.60
Honorine	....
Ingot.	....
Lower Mammoth.	41
Little Bell.	1.00
Little Chief.	03
Mammoth.	1.60
May Day.	28
Mason Valley.	....
New York.	02½
Mountain Lake.	26
Ontario.	....
Onio Copper.	2.65
Nevada Hills.	2.75
Standard Copper.	....
Sacramento.	....
Silver King.	3.00
Silver Shield.	03
South Swansea.	15
South Columbus Cons.	53
Tetro.	01
Uncle Sam.	40½
Utah Mining.	1.10
Victoria.	....
Victor.	04
Yankee.	26
Iron Blossom.	23
Sioux Cons.	17
Crown Point.	15½
Seven Troughs.	31

*Otis & Hough.

COLORADO CORPORATIONS.

The following corporations doing business in Colorado will distribute dividends in January with the amounts as follows:

American Smelting and Refining Company, common	$1,000,000
American Smelting and Refining Company preferred	875,000
Denver & Rio Grande pfd.	1,144,035
Denver & Rio Grande	1,195,825
Colo. Springs & Cripple Creek District railway.	44,375
Colorado Midland.	183,580
Colo. & Northwestern	25,000
Colo. Fuel and Iron Co.	16,620
Victor Fuel Co.	49,000

United States Treasury.

Fiscal Year 1907-8:	Dec. 23	This Month
Receipts.	$2,177,364	$37,365,362
Expenditures.	2,310,000	43,840,000
Deficit.	$132,136	$6,474,638
Fiscal year 1906-7:		
Receipts.	$2,261,956	$43,026,821
Expenditures.	2,460,000	36,560,000
Deficit.	$198,044	*$6,466,821

*Surplus.

	Dec. 23, '07	Nov. 23, '07
Av'l'ble cash bl.	$266,159,692	$239,300,542
Of which in bks	256,912,426	227,418,877

National bank notes received for current redemption: This day, $466,709; this month, $7,574,512; fiscal year, $103,524,800; national bank notes awaiting redemption, $9,587,750; 5 per cent. redemption fund, $27,170,518.

The Washoe smelter of the Anaconda Mining Company produced 18,000,000 pounds of copper in the month of July, just before the drop in copper curtailed the production.

TRADE NOTES.

The Sullivan Machinery Company has issued the second edition of Catalogue No. 60, on the excavation of rock by machinery, which contains prices, weights and specifications on Sullivan machine rock drills, with brief mention of the Sullivan air-hammer drills and compressors. It is well illustrated and contains tables on air consumption with factors of multiplication for various altitudes and pressures. Pp. 79.

The John A. Traylor Machinery Company of Denver has sent out the second edition of Bulletin "E," containing description and drawings of the Imperial Ore Screw, with instructions for its adjustment. Pp. 15.

An attractively illustrated catalogue (No. 5), has been received from the Kilgore-Peteler company of Minneapolis, describing the Peteler industrial and mine cars. Pp. 56.

Section L of Catalogue No. 1 on the Kennedy Gyratory crusher has been received from Chalmers and Williams of Chicago. Illustrated. Pp. 43.

Allis-Chalmers Bulletin No. 1408 and No. 1707 are ready for distribution. No. 1408 describes the advantages of the Tremain steam stamp, and No. 1707 treats of log or timber conveying machinery.

Bulletin No. 4537 of the General Electric Company contains diagrams and descriptions of electric locomotives ranging from 17 to 150 tons for all classes of service including mining, passenger and freight service. Pp. 17.

Malapai is derived from two Spanish words, "mal," meaning bad, and "pais," country. It is used in New Mexico and Arizona to denote lava beds.

Monazite is an anhydrous phosphate of cerium, lanthanum, didymium, etc. It is found in placer ground and recovered by the methods used in saving gold.

Salt is usually mined by the solution method; that is, the salt is dissolved by running water into the ground, and then precipitated when it reaches the surface.

Man elevators have been in use for over a year in some of the mills and sampling works of the large copper companies. They are time-savers and worth the cost of installation because a trip up-stairs is usually the occasion of much loafing on the part of the men.

SCIENTIFIC AMERICAN.

$2.00 Per Year JANUARY 3, 1908 Price, 10 Cents

MINES AND MINING

FOURTEENTH YEAR WEEKLY BLISHED 1893

Vol. 15 1824 CURTIS STREET, DENVER No. 14

Scientific American Ex 361 Broadway

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The Ohio & Colorado Smelting & Refining Co.

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New York Office, 52 Broadway

Smelter, Salida, Colorado

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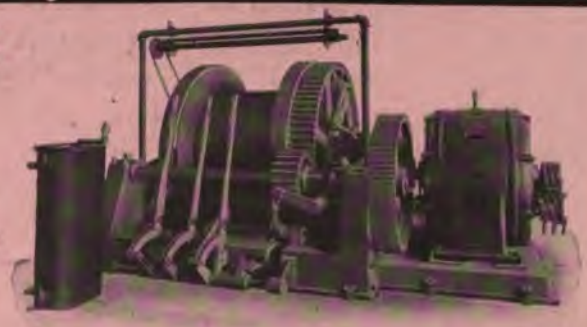
MINING AND MILLING MACHINERY

THE DILLON IRON WORKS CO.

ENGINEERS AND MANUFACTURERS

DENVER, COLORADO U. S. A.



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DURABLE AND LASTING

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STEAM ELECTRICAL AND HYDRAULIC ENGINEERING ~ MINE AND SMELTER SUPPLIES.

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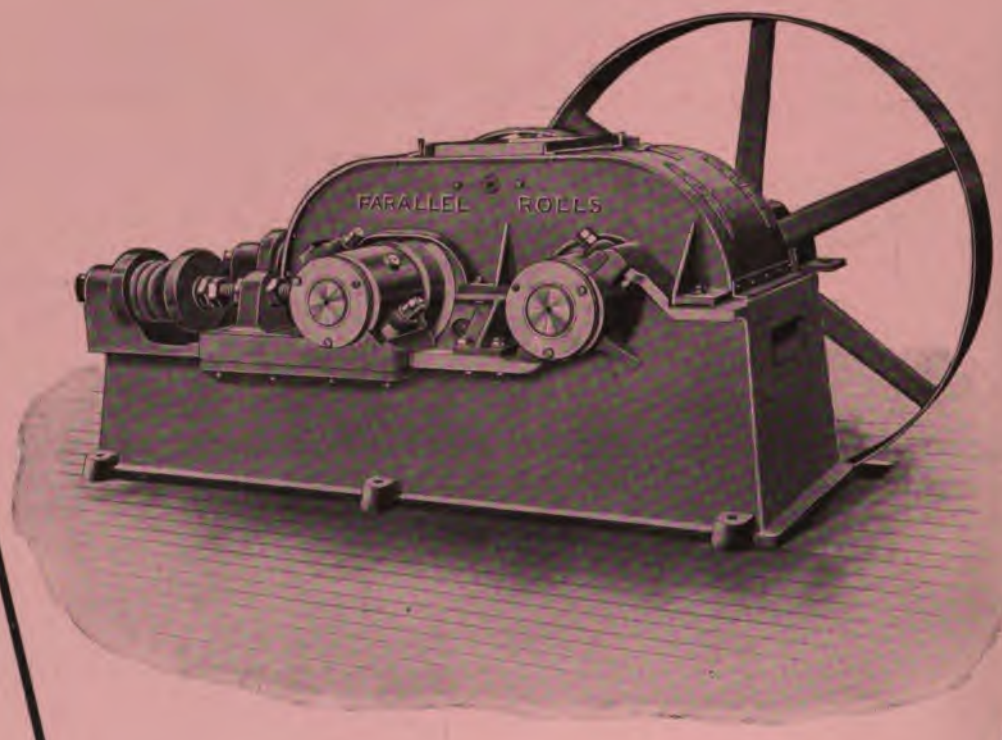
Strongest, Simplest, Most Durable and Most Efficient Rolls on the Market



Self contained construction. Removable journal boxes, so arranged as to present three bearing surfaces before requiring rebabbitting. Movable roll carried on a sliding saddle, and both shafts always parallel regardless of wear.

ASK ANY MILLMAN WHO HAS RUN THEM— HE KNOWS

The Hendrie & Bolthoff Mfg. & Supply Co.

DENVER, COLORADO, U. S. A.

MINES AND MINING

WEEKLY

Vol. XV | Denver, Colorado, January 3, 1908 | No. 14

MINES AND MINING

A. J. CASEY.....Manager
C. L. HALL.....Editor

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We will be pleased to publish any correspondence relating to mining, milling, metallurgy and kindred subjects, or sharp, clear photographic sketches pertaining to improved machinery, new inventions, mines, mills, smelters, or of any other branch of the mining industry. As a matter of protection and good faith, name and address must accompany such communication.

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The Contest

On another page of this issue, we have announced a rock drill contest to be held under the direction of this paper. The movement is something of a departure for a technical mining journey and at first thought savors of the various contests inaugurated by the daily newspapers. However, our object is not the same, and we feel that it will be for the best interests of mining generally.

Anything which tends to give information to an engineer which he alone could not well obtain, should be of great value. In this contest not only will the merits of the drills be thoroughly discussed, but the respective values of, costs, air consumption, repairs, etc., will be brought out. It is also hoped that valuable data upon the length of usefulness of a drill will be advanced by engineers and manufacturers.

The idea involved in this competition might be extended with proper conditions to other machinery used in mining and milling. A test of concentrating tables would be easy and extremely enlightening. It would require a complete series of runs upon several different ores at various meshes, but the result would warrant the trouble. The object of a large percentage of technical articles is to describe the practice used in the mines, mills and smelters throughout the country, in order that knowledge concerning the best machine for any particular work may be given to progressive engineers, and as a competitive test furnishes such results in a concentrated form with all ordinary and unusual conditions stated, we know of nothing that would be more appreciated by the buyers of machinery than such data. If a large, well-to-do mining or milling company contemplate the installation of a plant in this day and age, tests of different machinery upon sample carloads of their ore is usually made, but such are expensive, and while perhaps cheaper in the end, frighten the small mining man by their first costs.

In ore dressing and smelting, the data on capacity, horse-power, etc., of machines, collected by one man, not infallible with reference to his ideas upon the conditions, are indispensable as shown by the sale of such books upon publication. How much more valuable would be similar statistics collected under the direction of a committee composed of several well known experts? The merits of such work is unquestionable, but the extent of its value is debatable, and can only be proved by experience.

Conditions Improving

According to the Financier, the showing of the associated banks of New York City, the last of December was a great improvement over the week previous, indicating steady and wholesome recovery.

"The gain in cash, amounting to $9,438,500, was larger than had been estimated and probably represents transactions between banks not recorded in the reported ordinary transactions.

"The heavy liquidation in loans continues, the decrease for the week having been $17,752,400, making a total of nearly $44,500,000 since the middle of November. Deposits fell off $8,568,600, owing to loan liquidation, and the decrease in this item, coupled with the cash increase already noted, brought the banks $11,580,650 nearer the elimination of the reserve deficit, the latter now standing at $20,170,350, as against $54,000,000 reported six weeks ago.

"If the twenty-five per cent. reserve carried by the banks against the $78,889,100 of government deposits be eliminated, the safety of such deposits being secured by pledges of bond security, it is found that the reserve deficiency on commercial deposits have been made up, the percentage on this class of business amounting practically to twenty-five per cent. The disappearance of a premium on currency at the end of the week and for the resale in London of gold engaged for American import go to show that normal conditions in banking are again at hand.

"It is true that the New York bank statement during the next week or two will be affected temporarily by the disbursement of January interest and dividend funds, but in this connection it is also true that large amounts will be sent to New York to meet these requirements. At the

present rate of progress the middle of January should mark the extinguishment of the present reserve deficiency."

The statement of clearing house banks for the five days that week shows that the banks hold $20,170,350 less than the requirements of the twenty-five per cent. rule. This is an increase of $11,580,650 in the proportionate cash reserve as compared with last week. The statement follows:

Loans $1,147,694,400, a decrease of $17,752,400.

Deposits, $1,050,925,400, a decrease of $8,568,600.

Circulation, $71,736,600, an increase of $1,077,000.

Legal tenders, $54,686,700, an increase of $3,067,300.

Specie, $187,874,300, an increase of $6,371,200.

Reserve, $242,561,000, an increase of $9,438,500.

Reserve required, $292,731,350, a decrease of $2,142,150.

Deficit, $20,170,350, a decrease of $11,580,650.

The Labor Question

The annual banquet of the National Civic Federation, held last month in New York, at which the peaceful relations between capital and labor was the principal theme discussed, proved to be very wise and conservative statements of men without passion or prejudice. Among the speakers were General Frederick D. Grant, George W. Perkins, a prominent and able banker, and John Mitchell, president of the Mine Workers of America.

Mr. Mitchell said he considered it the highest duty of every man to work for the welfare of his country, the betterment of citizenship and the uplifting of the toiling masses. "So far as I have been able," said he, "to control the affairs of my organization it has been in the cause of peace. Happy would be the day if strikes, lockouts and attendant evils were no more. I am not sure that the time will come in our lives. But is it not better that we sit down and reason it out and see if reason cannot take the place of force?"

George W. Perkins, before speaking of the profit sharing plan, paid a tribute to the character of Mr. Mitchell saying that the progress that had been made in the relations between capital and labor in the last five years had been due more to the standards and work of Mr. Mitchell than to any other man. Mr. Perkins described in detail the profit sharing plan of the United States Steel Corporation.

General Grant, speaking of the question of the abolition of the canteen in the army said that, while he himself was a total abstainer, he regarded the canteen the less of two evils, until civil authorities closed vicious resorts near military reservations, he would be an advocate of the canteen in the army.

The time is not distant when these complications will be done away with. Satisfactory arbitration or some other peaceful means will be adopted to put an end to these costly labor troubles. They are not only a great loss to those directly concerned, but they are a great loss to the country, and a stumbling block to its progress and prosperity. Mutual arbitration established by law and rigidly enforced would settle the question.

Circulate the People's Money

The people have been looking to the Sixtieth Congress for relief from the peculiar financial stringency that now afflicts the country. The industries were never in better shape to mark an era of marvelous prosperity. Crops have been bountiful all over the land; the mines, barring copper, have produced more than their usual output; manufacturing has been heavy and prosperous, and the industries of the country are everywhere on the broad basis of healthy growth and prosperity. Then why this money shortage? There is more money in the country than ever before in its life. Who are responsible for this distrust? Not the masses, the wealth producers. With more than thirty dollars per capita there is a money famine in the country. The United States treasury and sub-treasuries are overflowing with money. There is something rotten in Denmark.

The farmers have harvested their great crops; the world needs their surplus; the railroads and steamships are ready to move it; but the lack of money, the blood of trade and commerce, has paralyzed business in a land of marvelous abundance. The system needs remodeling. It has been badly managed. The financial doctors are numerous, but widely divergent, and their specifics are untenable. It is the business of Congress to come to the rescue in the interest of the people. Congress should have the ability and the courage to establish a safe, stable and liberal financial policy for the nation. Scores of brilliant ideas will be poured in upon that body for months to come, but a selfish motive will most likely lurk behind them all. The money power will take care of itself. It is the interest of the masses that needs looking after, not the classes.

The country wants something more tangible than suggestions, debates, ideas and other nonsense. It is sick and wants to get well without delay. Partisan scheming, petty maneuvering and evasion will not avail. It is the time for patriotism to rise to the needs of the country and establish a policy that will lift it from its bed of sickness and place it on the broad and safe basis of justice and enduring prosperity.

Ours is a vast country of boundless resources, and its possibilities are beyond the grasp of the human intellect. Foreign nations speak of us as the new world, the hundred billion dollar country, and we want to show them that they have underestimated us, that we are aiming higher than that and expect to reach the two hundred billion dollar mark in the next ten years. We stand today at the threshold of our country's growth and power. She is just beginning to comprehend her unlimited resources and boundless possibilities. Throw down the bars and open wide the gates to legitimate enterprise in this country and see what the next half century will develop.

We are in the first stages of youth and are entering joyfully into the march of progress. Let the good work go on. Open the money vaults, the government treasuries, and let the peoples' money circulate in the healthy business channels of the country. There are great public improvements blocked out, and vast sums of money will be required in the next two or three decades. If our circulating medium amounted to fifty or sixty dollars per capita, it would not be too much provided its circulation was promoted by the government. The people would be proud of its Congress if it would establish such a courageous and vigorous policy as would put their money into circulation to their benefit. That is what money was made for. It should not be hoarded in government vaults, or any other hiding place of useless inactivity. Except its normal reserves, this country should have all its money in active circulation, and it could safely and profitably use two or three billions more than it has.

A great navy is proposed, river and harbor improvements, a vast irrigation system in the West, coast defenses and lighting, the completion of the Panama canal; better postal facilities and defenses established in Alaska and other remote territory; improved equipment for the army and navy and hundreds of other needs requiring vast sums of public money and giving employment to millions of men and blessing tens of millions.

Rock Drill Contest

Some few weeks ago, we had brought to our attention quite forcibly some very noticeable conditions which we thought might be alleviated, and as a result we have announced a Rock Drill Contest, with the hope that it may serve the high purpose for which it has been planned. The conditions spoken of above are these:

1. The overlapping claims made by the manufacturers of different rock drills.
2. The lack of reliable comparative data on rock drills available for the use of mine engineers and superintendents.
3. The absence of proper time and care in the rules and conditions governing all previous rock drilling contests between machines.

We frankly admit that the task we have set out upon is by no means an easy one, but no one better realizes the obstacles to be overcome in finishing it. Before making such announcement we not only outlined a general plan but considered many of the details, and although the undertaking has assumed large proportions, we are satisfied that it can be well and successfully consumated.

In discussing the conditions mentioned it may be well to first consider the (2) first, that is, the lack of available data for mining engineers and mine superintendents. Every ambitious man likes to be up in his special line of work, likes to know as much as he can possibly in the time available, and to feel confidence in any advice he might give as a result of his investigation and study. However sometimes the difficulties are almost impossible to overcome, and he is forced to guess. This is the case when purchasing a rock drill—there are many standard makes, tested and proven by use, but in order to determine the best it would be necessary to subject each drill to the same conditions or else obtain such data from an accurate source. If different people in different mines should try to subject the same drill to a test there would very likely be a variance in the results, for while all might designate a rock as "granite," yet the hardness and texture of granite would not be the same in different localities. As every mining man knows, even this kind of data is rare, and if the purchaser is to get the best drill on the market, some information is essential.

Recently in speaking with the manager of a large property in Colorado with regard to equipment he gave the information that in order to decide which was the best of the small air hammer drills, he bought four different makes, and kept tab on the work of each. Of these, one very quickly proved "no good," and the ——— drill proved itself the superior of them all, but there was an unnecessary waste of money in determining the relative values. How much better it would have been if the purchaser had known at once what drill was the best —the gain would have been considerable (in this case) in both time and money.

In reference to the claims of manufacturers, we will say that we believe them all perfectly honest in the statements made, however, they cannot prove the declarations that their drill "has a greater capacity," "less repair bills," "less air consumption" than any other rock drill made, because they have not tested other drills under the same conditions as their own. It is an assured fact that most of the drill manufacturers in the United States haven't seen more than the drill catalogue of a considerable percentage of their competitors. In a late issue of the recognized leader among mining journals, were three advertisements by drill companies, in which each concern made practically the same claims. Reference is not made here to the use of the word "best" which has grown legitimate from constant reiterating, but to specific conflicting statements. The result of this is that the buyer of rock drills give up trying to get the best value for his money, but picks the make used in a neighboring mine or surrenders to the oratory of the sales manager of another concern. It may not be possible to remedy such proceedings, but if there is a way to do it, it is by fair, impartial and conclusive tests of all meritorious rock drills.

The conditions of such a contest are sure to be the one "bone of contention," and while they may not suit, yet they can at least be made fair to each competitor. There are, in the placing of a valuation upon a drill, five things to be considered:

1. The number of inches of holes of a required diameter which it can drill under all conditions.
2. The cost of repairs on each machine.
3. The air consumption.
4. The initial cost from manufacturer.
5. The weight.

The order of placing is about the relative position which each should be given in arranging them in order of importance. The first is of the greatest importance, not only because large tonnage is obtained with fast drilling machines, but the factor of time is often important, as for instance in tunnel work. The second ranks above the fourth, because a poorly constructed machine is not only expensive, but a nuisance. Moreover the time wasted with such machines is rarely fully estimated—for they waste both the time of the superintendent and miner. The air consumption question has been given a little too much weight, for the reason that the cost of a drill using ten per cent. or fifteen per cent. more air than another has been obtained by taking the percentage of the total cost, which is wrong as many know—it is even incorrect to count the saving as ten or fifteen per cent. of the cost of compressing the air, for the engineer's pay and the fireman's wages do not vary with air compression. Yet this is an important consideration and is the line which differentiates the old drills from the modern types, hence it is considered above first cost. Under first cost, there is little to be said, for there is not a very noticeable difference in the prices of standard machines, due to the importance of this feature to many buyers, causing competition between manufacturers. The weight of the drill simply regulates the uses to which it may be put, and prevents comparison between hand and two-man machines. Weight is an easy proposition to handle in determining the economy of a drill.

Mines and Mining in promoting this contest believes that it will forward a clearer knowledge of the present drills upon the market, both among manufacturers and mining men. To the winner of each of the contests, which will consist of at least two classes, (1) for two-men machines and (2) for small air-hammer machines, this journal will present a silver loving cup, suitably engraved. The rules governing the trials will be drawn up and determined upon by a committee, which will very likely be made up as follows:

A professor of mining, a mechanical engineer, a consulting mining engineer and two mine superintendents. These men will rank high in their profession and be beyond the accusation of unfairness, so that the fairest possible conditions are assured.

CORRESPONDENCE ON THE CONTEST.

Below is given a copy of the letter sent to the various drill companies of the United States, and following some of the replies received to date:

Denver, Dec. 29, 1907.

Gentlemen:—In view of the great interest shown by mining men in the claims of various drills, and the absence of any comparative data with regard to them, the management of Mines and Mining has decided to institute competitive tests between the different makes of drills and to offer a silver loving cup as a trophy to the winner in each class.

The conditions of the contests and the classification of the drills will be determined by a committee of prominent mining engineers of Colorado, and will be as fair to each competing drill as it is possible to make them. It has been decided that there will be at least two classes of machines, namely, one for the air hammer hand drills and one for heavier two-man machines.

We wish to extend to you our earnest invitation to enter these contests, as they will attract the universal attention of mining men and will bring out the respective merits of your drills over other competitors.

Any suggestions which you desire to make will be gladly received and of assistance in drawing up the rules governing the contest. It is our intention to send a preliminary set of rules, drawn up by the committee from suggestions received, to the representatives of each drill for criticism, and refer these criticisms to the committee before a final set of rules are fixed upon. The contest will probably be held in Cripple Creek, as a feature of the program to be given to the delegates and others attending the Democratic National Convention in Colorado, July, 1908.

Very truly yours,
MINES & MINING.

December 26, 1907.

Mines and Mining. 1824 Curtis St., Denver, Colorado:

Gentlemen:—We have your favor of the 24th by Mr. Casey, and beg to say in reply, we see no reason why we shall not be willing to enter the test proposed and, in fact, if the conditions of the test are such that we consider it will be fair and impartial and conclusive test of the merits of the drills, we shall welcome same. We shall be pleased to receive a copy of the preliminary set of rules.

Yours very truly,
THE J. GEO. LEYNER ENGINEERING WORKS COMPANY.
By J. A. Farwell, Manager.

Cleveland, Ohio, Dec. 28, 1907.

Mines and Mining, Denver, Colo.:

Gentlemen:—We are just in receipt of your favor of the 24th and are greatly pleased to note the interest you are taking in the comparative merits of different mining drills, and that you have decided to offer a trophy to the winner of the test.

We woul be more than glad to enter into competition with other hammer drills if you will furnish us with full information as to the rules, as we think we have the best hammer drill made and would be glad of the opportunity of proving it to others. We have not at this time any suggestions to make, as we feel sure that the preliminary set of rules which you will draw up will be perfectly fair, and we also feel that a test as conducted by you will be fair in every particular.

Trusting to hear from you at an early date, we are

Very truly yours,
THE CLEVELAND PNEUMATIC TOOL COMPANY.
Per Geo. H. Hall, Mgr. of Mining Department.

Denver, Colo., Dec. 27, 1907.

Mines and Mining, City:

Gentlemen:—In reply to your letter of the 24th inst., would say that we would be pleased to receive any information or a book of rules governing the contest which you speak of, and we would also like to offer a few suggestions relative to the manner in which a contest of this kind should be pulled off.

We have had some experience in Rock Drilling contests with air hammer rock drills and have gained some knowledge thereby, Should your repsentative be out our way, or should you feel desirous of obtaining these suggestions we would be pleased to meet with you and go into this thing from a practical standpoint.

Thanking you, we remain,

Yours very truly,
C. H. SHAW PNEUMATIC TOOL CO.
Per Wm. Shaw, Vice President.

Chicago, Ill., Dec. 28, 1907.

Mines and Mining, 1824 Curtis St., Denver, Colorado:

Dear Sirs:—We have your letter of the 24th and are interested to note your plan for conducting rock drilling tests next July. We have sent copy of your letter to our Denver manager, Mr. Dinsmoor, and suggest that you take this matter up with him, since he is on the ground and we are not.

Yours truly,
SULLIVAN MACHINERY CO.,
S. B. King.

Denver, Colo., Dec. 30, 1907.

Mines and Mining, 1824 Curtis St., City:

Dear Sir:—We have your favor of the 26th inst., regarding the drill contest to be held in Cripple Creek, during the month of July.

We shall no doubt be ready and willing to enter such a contest.

Yours very truly,
JOHN A. TRAYLOR MACHINERY COMPANY.
Per T. B. Burnite.

DANGER FROM FERRO-SILICON.

It has been established that poisonous gases are given off by ferro-silicon which contain high percentages of silicon, and the Iron Age (Sept. 10, 1907) gives a report of the memorandum issued by the British Home Office in regard to the transportation of this substance. The evolution of gas is due to the disintegration of ferro-silicon into powder by the action of moist air. The iron ore and quartz, which are reduced in the electric furnace to produce ferro-silicon, often contain phosphates, which, in presence of carbon, and at the high temperature of the electric furnace, would no doubt be converted into phosphides, combining with the lime to form calcium phosphide. In the same way any arsenic present would yield calcium arsenide. These would be decomposed in presence of water and evolve phosphoretted and arseniuretted hydrogen, both of which are poisonous. The explosion occasionally reported, of ferro-silicon in transit, is less easily explained and several theories have been put forward. It is believed that if moisture is carefully excluded from the casks or drums in which ferro-silicon is packed no danger need be feared.

Oxygen has become the almost universal remedy in cases of poisoning by gases—such as coal gas, acetylene, foul air from sewers, after-damp of mines, etc.—but its application is a difficult matter for the inexperienced bystander. A new apparatus by Dr. Brat made in Westphalia, is designed to clear the lungs and act more or less automatically in giving artificial respiration. The protable form consists of a fair-sized oxygen cylinder, a chest containing a small air pump, levers and other parts, and the usual face mask for the patient. When able to do so, the patient breathes the oxygen without help. If necessary, the attendant gives a rhythmical motion to the pump valve, and the liberated oxygen actuates the pump, withdrawing air from the lungs. Respiration is thus re-started or supported.

History of Chemical Industry in Colorado

By R. B. HOSKER*

An eminent writer has said that the prosperity and importance of a manufacturing district can be best gauged by the size and character of its chemical works, because manufacturing requirements involve the extensive use of chemicals for many purposes. This being so, a brief description of the works of The Western Chemical Manufacturing Company, on the banks of the Platte river, near Valverde and within twenty minutes' drive from the Denver postoffice, will give some index as to Denver's importance as the manufacturing center of the trans-Missouri country.

Probably a few historical facts might be in order regarding the chemical industry in Colorado.

The first attempt at manufacturing sulphuric acid in this state was by William West. He erected a small plant at Black Hawk in 1875, and produced about 2,000 pounds daily. He continued the business about three years, but the demand for his goods was so limited, and the expense of manufacturing on a small scale so great, that he was compelled to suspend business.

In 1879 Mr. Pierce, with others, built a small plant at Golden. This proved a failure, only running about one year.

The next attempt was by The Denver Smelting and Chemical Company, who organized in 1881 with William West as manager. They purchased ground near Valverde and erected one chamber and other necessary apparatus for sulphuric acid manufacture. This venture also proved a failure.

In 1885 The Western Chemical Works Company was organized by E. N. Ashley and Dr. N. K. Norris, who commenced the manufacture, on a small scale, of various chemicals, on the Valverde site.

The history of this company was very interesting, the struggles for success being many and varied, but eventually by the untiring efforts of E. N. Ashley and his son F. R. Ashley, together with John C. Skinner, who took charge of the plant in 1892, the concern has become one of Denver's most successful industries.

The present company (The Western Chemical Manufacturing Company), was re-organized in 1902. The present officers are: F. R. Ashley, president and general manager; C. B. Kountze, vice president; J. C. Skinner, treasurere and general superintendent; R. B. Hosker, secretary. The works are spread over an area of about thirty-five acres, and over twenty acres belonging to the company are available for future developments.

The products at present manufactured embrace the following: Commercial sulphuric, muriatic and nitric acids; aqua and anhydrous ammonia: chemically pure acids and ammonia; liquid carbonic acid gas; copperas, etc.

That sulphuric acid is the base of nearly all chemicals and the very life and soul of the chemical industry may be seen from a glance at the substances to whose manufacture it is escential, or, at any rate convenient. From it is produced most of the commoner acids, the sulphates of copper, iron, zinc, etc., is used for making nitroglycerine, battery fluid, or electrolyte for storage batteries for dyeing and bleaching, electro-plating, in the manufacture of Epsom and Glauber salts alum, for producing carbonic acid gas used in mineral waters, for the refining of crude petroleum oils. The Colorado Fuel and Iron Company use immense quantities for cleaning iron wire It is also used in the refining of copper by electrolysis, also in the leaching of silver and copper ores. Probably the most extensive use in Colorado, however, is in the chlorination of gold ores.

There is no secret connected with the manufacture of sulphuric acid. All books on technical chemistry giving ample information on the subject. The principal ingredient used is sulphur, either native, or from iron pyrites. The latter are used by this company, which are suplied by the zinc mill recently erected in proximity to the acid department.

The ore, or pyrites, contains about forty-three per cent. to forty-five per cent. sulphur and is roasted in Herreshoff furnaces. The resultant sulphurous acid gases pass from the furnaces through an iron flue into a series of leaden chambers, where on coming in contact with gaseous nitric acid and steam it becomes converted into sulphuric acid. The nitric acid gas is produced by the action of sulphuric acid on nitrate of soda, and is generated within the flues by a special arrangement, and pass along with the sulphurous gases into the lead chambers. The combined gases, together with steam and air, mix in the chambers and condense as sulphuric acid. This is known as chamber acid and has a specific gravity of about 52 degrees Beaume.

This is condensed to sixty-six degrees Beaume in a new and improved apparatus which produces a finished product which is water white and of a high gravity. The resulting concentrated acid is cooled and forced by compressed air into the steel storage tanks which are elevated about twelve feet above the ground level. From these storage tanks the acid is allowed to run into tank cars and is ready for shipment.

The company owns a train of tank cars, twenty-eight in number, and has storage capacity for about 7,000,000 pounds of sulphuric acid.

The sulphuric acid department consists of four distinct plants arranged so that each can be operated separately. The combined plants are operated by sixteen Herreshoff furnaces which are connected with thirteen leaden chambers, three Glover and four Gay-Lussac towers. The chambers are 110 feet long, twenty-five feet high and thirty feet wide, each one being constructed of six-pound lead, that is, each superficial foot weighing six pounds. The enormous quantity of lead necessary for an acid plant can be calculated from the above data. The producing capacity of the four plants is approximately 3,000,000 pounds sulphuric acid monthly.*

Muriatic Acid.

Muriatic acid is obtained by the combined decomposition of salt and sulphuric acid. The company have two separate plants for its manufacture.

Salt is thrown into a shallow, covered iron pot and sulphuric acid added in suitable quantity. The mass is constantly kept stirred by a mechanical device and heated by means of a furnace underneath the pan. The resulting muriatic acid gases are conducted through a series of glass vessels and become condensed as liquid muriatic acid of commerce.

This acid is extensively used by the beet sugar factories, the Colorado Fuel and Iron Company also use considerable quantities at their works. It is sometimes used in place of sulphuric acid by cyanide mills for dissolving the zinc in their gold slimes.

Nitric Acid.

Nitric acid is manufactured from nitrate of soda and sulphuric acid. The procedure is almost identical to that of muriatic acid. The exception being that the generating pots are of a dif-

*Secretary Western Chemical Co.

*The entire plant when in full operation is fully 50% in excess of the Western demand. Cheapness of production necessitates large production, one reason why small acid plants very seldom become a success financially.

ferent pattern, and the mass is not stirred during the process. The nitric acid gases become condensed on their passage through glass vessels.

A special brand of nitric acid free from chlorine is now used in large quantities at the Denver mint for the parting of the gold and silver bullion.

Nitric acid is also used in the manufacture of nitro-glycerine, in electroplating and in etching cuts for printing purposes, etc.

Aqua Ammonia.

All ammonia, whether in the form of aqua, anhydrous, carbonate, chloride or sulphate of ammonia, is obtained primarily from one and the same source, viz., gas liquor, which is merely water that has been applied to the washing of coal gas, whether such washing be done by gas companies supplying illuminating gas, or by by-product coke oven companies, whose business is mainly the manufacture of coke. This gas liquor, or wash water, as it may be called, contains ammonia, along with many other substances of little or no value, at the present time. The ammonia is usualy present in ordinary gas liquor to the extent of say from one per cent. to one and one-half per cent. in the condition principaly as carbonate of ammonia, along with some sulphide, and other combinations of sulphur and ammonia. This so-called gas liquor is today the source of all commercial ammonia.

In the manufacture of aqua ammonia this gas liquor is subjected to process of distillation, or more properly speaking a series of distillations, by which the ammonia is freed from the gas liquor. Before, however, the liquor is distilled, or during such distillation, the liquor is treated with caustic lime for the purpose of decomposing the ammoniacal salts contained in the gas liquor, and thus setting free the ammonia in a gaseous condition.

The apparatus in which this distillation is conducted consists of large cylinderical vessels made of strong boiler plate and capable of withstanding considerable pressure. In these vessels the gas liquor is subject to distillation, while at the same time it is brought into intimate contact with the lime, before mentioned, by means of stirers, or agitating gear. In this manner is effected the decomposition of the ammonia compounds of the gas liquor and the expulsion of the liberated ammonia gas therefrom.

The ammonia gas so evolved is, however, accompanied by various volatile substances which must be removed before the ammonia can be made a marketable article. Suffice it to say that to those familiar with the business, this offers no insuperable difficulty. The company has installed an unique device by which all the impurities are entirely eliminated. The ammonia gas after having been purified is now in condition suitable for conversion into either aqua or anhydrous ammonia, the former is ammonia with water, and the latter ammonia without water; the former is what is used in the drug and paint business, and in the manufacture of ice in the so-called absorption machine, and by subsequent further dilution with water in the preparation of household ammonia Aqua ammonia as put on the market by the manufacturer contains seventy per cent. of water and thirty per cent. of ammonia gas by weight, and has a specific gravity of twenty-six degrees Beaume. Anhydrous ammonia, on the other hand, contains no water, but is simply the purified ammonia gas liquified by means of the combined influence of great pressure and fairly low temperature.

The choice of converting the ammonia gas into aqua ammonia or anhydrous ammonia, of course, rests with the manufacturer, and in this matter as in others, the condition of the market is the controlling factor. If it is found to be more profitable to make aqua than anhydrous ammonia, then the ammonia gas is simply led from the purifiers and made to pass into distilled water wherein it is rapidly dissolved, in the act of absorption, however, considerable heat is evolved and this must be removed as fast as formed, otherwise this increase would seriously, if not altogether, interfere with the further absorption of the ammonia gas. When the water has absorbed about thirty per cent. by weight of ammonia gas, then it is called aqua ammonia twenty-five degrees Beaume, and is put on the market as such.

Anhydrous Ammonia.

If the manufacturer finds it more profitable to make anhydrous than aqua ammonia, the ammonia gas leaving the stills, or generators, after being submitted to the same scheme of purification at that intended for the manufacture of aqua, can be drawn away by powerful gas compressors, or pumps, and submitted to a pressure of about 150 to 180 pounds to the square inch, while at the same time it is deprived of its heat of compression by being made to pass through cooling coils, and thus liquified.

The liquified ammonia gas thus obtained, however, is far from being pure and must in consequence undergo further purification before it will be acceptable to the consumer. Perhaps there is no commercial substance on the market today that is required to be so pure and free from all foreign impurities as does anhydrous ammonia.

To further purify this liquid anhydrous ammonia, it is subjected to repeated redistillations, the impurities being retained as residues to be otherwise disposed of.

This scheme of repeated distillations, while very effective may, if found necessary, be supplemented by filtration through various alkaline substances such as through caustic potash, or caustic soda, or even newly burnt lime, these having the tendency to remove moisture, that is, if such be present in the liquified ammonia gas.

The finished product must be perfectly pure and dry, leaving no residue upon evaporation. Great care, however, is required in the taking of samples for testing purposes, to insure against the introduction of moisture from the surounding air, as anhydrous ammonia is hygrocopid to a high degree.

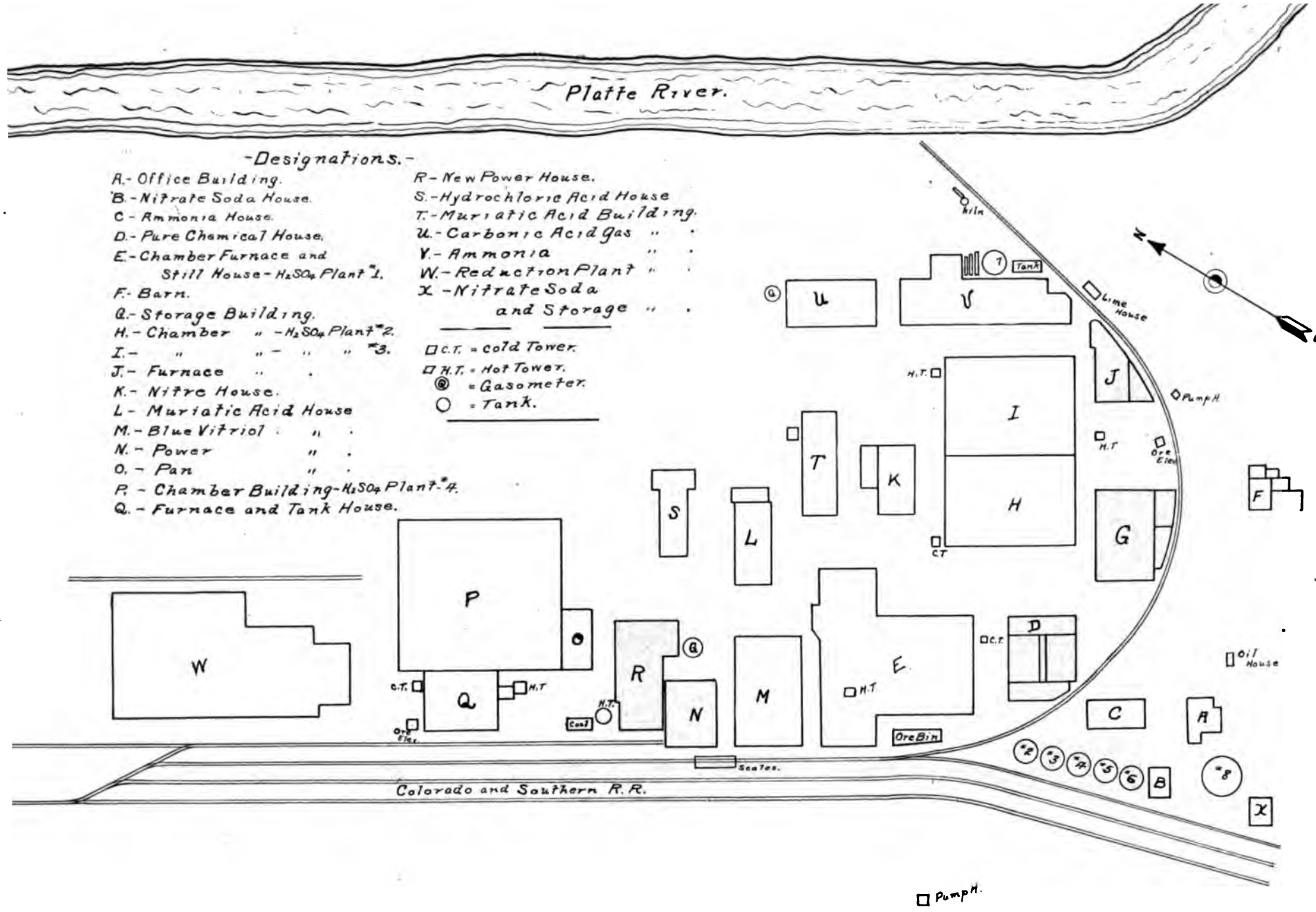
The liquified anhydrous ammonia is forced into steel cylinders of 50, 100 and 150 pounds capacity, and is ready for the market.

Liquified Carbonic Acid.

In the manufacture of ammonia a large amount of burnt lime is daily required for the purposes heretofore set forth. In order to obtain this it has been found necessary to build a kiln and make lime on the premises and thus secure the full benefit of freshly prepared material, lime rock, or limestone, as it is called, being used for this purpose. Lime rock consists of calcium oxide and carbonic acid gas, the latter to the extent of about forty-four per cent., and it is with the object of expelling this carbonic acid gas that the limestone is placed in the kiln and heated. To waste such a large amount of carbonic acid would be obviously wrong, therefore, the company have erected a large carbonic acid works and are turning out regularly, a large amount of this material in liquified form.

In order to do this the gases leaving the lime kiln, which by the way, are a mixture of air, nitrogen and carbonic acid gases, are drawn from the top of the kiln by means of a powerful fan, and made, after repeated purifications, to pass through towers and encounter a descending solution of lye. The lye has the property of absorbing the carbonic acid in the mixed gases, and retaining it, allowing, however, the other gases, air and nitrogen to escape.

All that is necessary to recover the absorbed carbonic acid from the lye is to subject the lye to heat in boilers. When the carbonic acid is driven off the lye, after cooling, is again used for the absorption of a further quantity of carbonic acid in the above mentioned towers.



Plan Showing the Buildings and Equipment of the Western Chemical Mfg. Co.

The carbonic acid after leaving the boilers, passes into a gas holder from whence it is passed through calcium chloride to remove any moisture, and is then led to a very powerful compressor of the four-stage type, whereby it is liquified at a pressure of 1,200 pounds per square inch.

The liquified gas being then stored in strong cylinders in quantities of eighteen, twenty, twenty-five and fifty pounds is ready for the market These cylinders, we may say, have been tested to a pressure of 3,700 pounds per square inch, and are in consequence perfectly safe at the pressure above mentioned.

The ammonia and carbonic acid plants were erected under the supervision of Thomas Charlton, who has had considerable experience with the manufacture of these products.

Chemically Pure Acids and Ammonia.

This department is strictly up to date, the greatest care being taken to insure the preparation of goods of absolute purity, both the acids and ammonia are manufactured entirely in glass vessels and all the products are carefully examined by a competent chemist prior to being bottled. These chemically pure goods are now being used by practically all the smelters west of the Missouri river, also, by all the leading chemists and assayers in this Western country. This alone is a sufficient guarantee of the purity of these goods. This department is now in charge of George C. Piwonka.

Milling Department.

In consequence of the decreasing demand for sulphuric acid, the company decided to erect a mill and engage in the zinc milling industry and at the same time produce an ore suitable for roasting in the Herreshoff furnaces and subsequently to separate the zinc and lead contents as by-products. This mill is now in operation. The installation comprises the following departments:

Sampling, or coarse crushing mill, dryers, fine crushing mill, roasters, magnetic separating mill, and wet concentrating mill.

The sampling mill consists of picking belt, one 10"x20" Blake crusher, one set 16"x36" McFarlane rolls, trommel, double Vezin sampler, elevators, and conveyors. There are two dryers, one White-Howell revolving drum, the other a Holthoff-Wethey rabble roaster. In the fine crushing mill are two sets 16x36 McFarlane rolls, one Rowand type Edison screen, one Perfection dust collector, elevators and conveyors.

The magnetic separating mill contain one Cleveland-Knowles 21-inch, and one type "E" two-pole Wetherill separators, one Rowand type Edison screen; one perfection dust collector, two small Vezin samplers, elevators and conveyors. At present but two concentrating tables are being used, but floor space has been provided for ten.

In operation the ore is shoveled from the cars to the picking belt, which feeds a shaking grizzley. The overs of the grizzley go through the crusher and after joining the throughs are carried by the belt conveyor to an elevator and discharged into the trommel. The overs of the trommel go to the rolls and are returned by the same elevator to the trommel. The throughs of the trommel are carried by elevator to the double Vezin sampler, which works in tandem and cuts out about one per cent. for a sample.

After passing the sampler the coarse ore goes by belt conveyors direct to dryers, or to hopper in bedding floor building from which it is drawn into a tram car and dumped at any point upon the floor. This floor is about 75x 112 feet and will hold approximately 3,000 tons of sulphide ore.

From the bedding floor the ore is trammed as needed in push carts holding 1,000 pounds and dumped into an elevator pit and is carried by the elevator and belt conveyor to either of the two dryers.

The dry ore is conveyed by an oscillating conveyor to an elevator which feeds the screen in fine crushing mill. This screen has two sides of perforations. The overs go to the medium roll, the throughs of the coarse perforations go to the fine rolls. Both rolls deliver back to the elevator which feeds the screen. The throughs of the fine section of the screen go by belt conveyor to one of three bins. These bins are arranged to serve the wet mill, the raw magnetic mill, or the roasting furnaces.

At present the ore is carried from the bins on an incline belt conveyor and discharged into a hopper over the roasting furnaces, from whence it is drawn into a tram car, weighed and dumped into roaster hoppers.

The roasted ore is returned to the separating mill, where it is sized on the Rowand screen, and delivered to the separators.

The magnetic iron and zinc are carried on belt conveyors to automatic samplers and delivered by elevators, the former to shipping bins and the latter to the Wilfley tables.

The tables make three products, lead, zinc and silica The lead and zinc are delivered into burlap lined bins by Frenier sand pumps, and the silica is washed onto the dump.

Present Works of the Western Chemical Mfg. Co., Denver.

All the different sections of the mill have separate motor drives, except the wet mill which at present is driven from the magnetic mill motor.

The mill has a present capacity of fifty tons, but is capable of being enlarged at small cost to 100 or 125 tons per day.

All kinds of milling zinc ores are to be treated including middling products and low grade zinc concentrates from other mills.

The mill, which is practically automatic, was designed by R. M. Henderson, who also has charge of the milling operations.

Power Plant.

A power plant is being erected which will consist of two 200-horse-power gas producers installed by the International Gas Power Company, of St. Joseph, Missouri, and two Westinghouse gas engines, one 190-horse-power and the other 160-horse-power. It is the intention to produce power, light and fuel gas for the entire plant. Lewis B. Skinner the Consulting Chemist and Metallurgist of the company has the supervision of this work.

Experiences of a Young Engineer—III

Being Letters Bob Braun Wrote to His Former Roommate, Theodore Gillespie in South America

Dear Ted:—Your welcome answer received and I was glad to hear from you. I agree with you in the statement that South America is a great mineral country, but the United States for me just now. The method of mining you described as being used in the Cerro de Pasco mines is good, especially where timber is so high, but a method I have seen lately in use at one of the mines here at Bingham Canyon wins the cup for economy and bigness. I will try and explain it to you as best I can. You can at least get the principle of the system from my description and a rough diagram, but the details would necessarily vary with conditions.

As you probably know, mining in Bingham must be on a big scale or not at all. On one property, the Boston Consolidated, which I expect to see

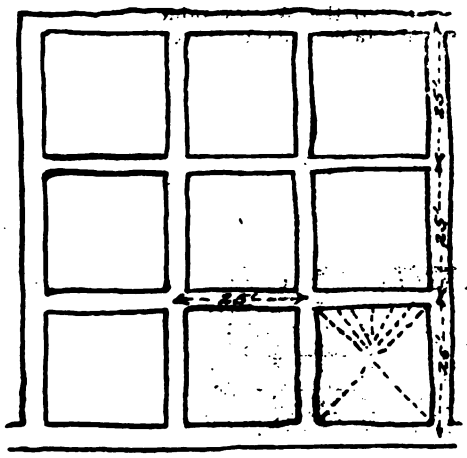


Fig. I.

soon, the operators are stripping off the waste rock, etc., with steam shovels, and expect to mine the low grade copper ore, which runs about 1½ per cent. copper, by the open pit method. I will tell you more about that after I see it, however. Years ago this camp was a gold and silver proposition, and considered rather unpromising. A mine manager told me a few days ago that in the eighties he could have purchased any one of several pieces of ground around here for $25,000 that today are worth $5,000,000 to $10,000,000. At one time a fellow named Schneider had a long-time option on one property and had been trying hard to sell it at a few thousand profit, but with no success; later, when the value of the copper deposits were realized, his option netted him about a quarter of a million—a lucky chap! I give this early history just to show you what a change low mining costs can cause in the value of a property. The geology at Bingham is complicated and interesting, being both sedimentary and igneous. Hence the ore does not occur in well defined veins, but in large uniformly mineralized low grade bodies, which makes caving and similar systems of mining applicable.

The system I will describe is used where the mineralized section is from seventy-five to ninety feet wide, with the other dimensions yet to be found. In using this method adits or levels are first run every hundred feet into the mountain, and the ground cut up into blocks with a horizontal projection of 75x75 feet and a height of 100 feet from level to level. These blocks or units are in different stages of preparation for removal, but only one is blasted at a time. In preparing, each block is subdivided into nine squares, each 25x25x100 feet by means of raising from the level below. At the same time that the raises or stopes are made the blocks are drilled full of holes from all sides, the waste being kept at the proper height by drawing out of the inclined chutes below. Fig. 1 shows how a horizontal plan of a block looks when ready for blasting, except that all the smaller blocks are drilled full of holes similar to the one shown. The inclined chutes are placed at the intersections and ends of all the stopes or drift raises. In Fig 2 is shown the elevation of the ground. The inclined chutes are made at an angle of about 55 degrees to the horizontal in order to break the fall of the rock. In starting to prepare a piece of ground these chutes are put in first by contract labor, and are made roughly 8x8 feet. From the top of these on the level above, the raising and driving is done, and the excess ore is drawn out at the bottom of the chute. No timber is used in any part of the work except as an aid to the machine men in drilling. When all the holes are drilled, each is loaded with powder and all fired at the same round. The result is that the whole block is pretty well shattered and the broken material is drawn off through the chutes. Occasionally there is a tendency for a chute to choke up, but a few sticks of powder on a pole will readily loosen it, and as the walls of the chutes are rock, no harm is done. Owing to the force of the explosion much waste is brought down on top of the ore, but as soon as it begins to show plentifully in the chute mouth, the drawing out is stopped and the chutes are left full of practically good ore. When all the blocks above one level have been mined, then the level below is treated in a similar manner.

This system of mining is all right for this place, and is very economical, as no timber is used, no mucking is done, and much of the work can be contracted. However, the conditions necessary for its use are rarely found. The system was first used in Bingham by a miner from somewhere in the British Isles—from Wales or Cornwall. There is another Briton here in Bingham, who tried an English caving system, but it failed for some reason, on account of the deposits being too flat,

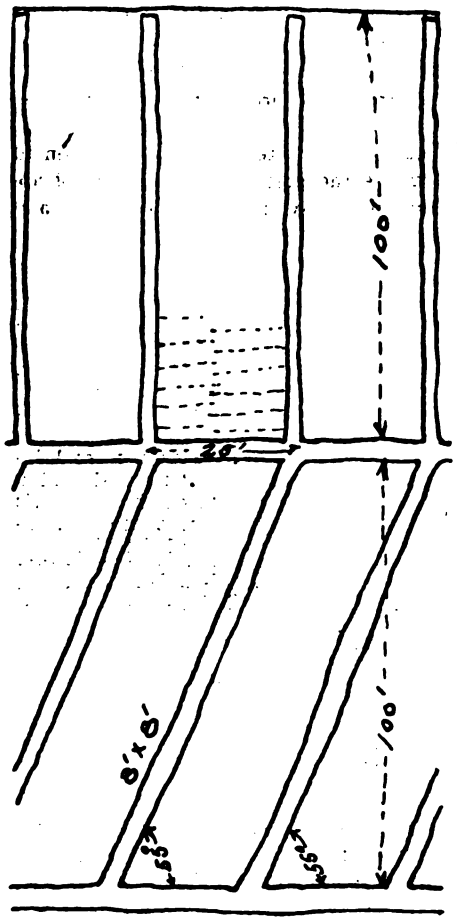


Fig. II.

I heard. I believe we have most countries beaten in metallurgical practice, but some of the continental countries can put out better miners. Some of them can put out awfully bum ones, too, as I can testify. I have 200 foreigners under me here, and there is just one of them that can speak half a dozen words of English or that will work if he can think of anything else to do. They get me wild sometimes, but I never let it out—for it wouldn't do any good. They can't understand half that you say to them, and it would

be wasting breath. Moreover, anyone of them would as soon use a piece of drill steel on you as to eat his dinner. Just a few days ago a railroad brakeman was killed by one of the Austrians for kicking him off the track. The Austrian hit the fellow in the head with an old coupling pin.

The grub in this place is eatable but the water is bad. There is nothing to the town, and as for the people who understand the English language you might as well be in a foreign country, almost. However, I am busy most of the time and don't mind it. My worst objection to this position is the changing from day to night shift and vice versa every two weeks, but I suppose I will get used to it. There is a chance to pull the mine superintendent's place here, and I intend to work hard for it. Hope you get the place you were expecting, and to hear how you like it in your next letter. I must close for this time. Yours as ever, BOB.

Salida Plant of the Ohio & Colorado S. & R. Co.

(By Staff Correspondent.)

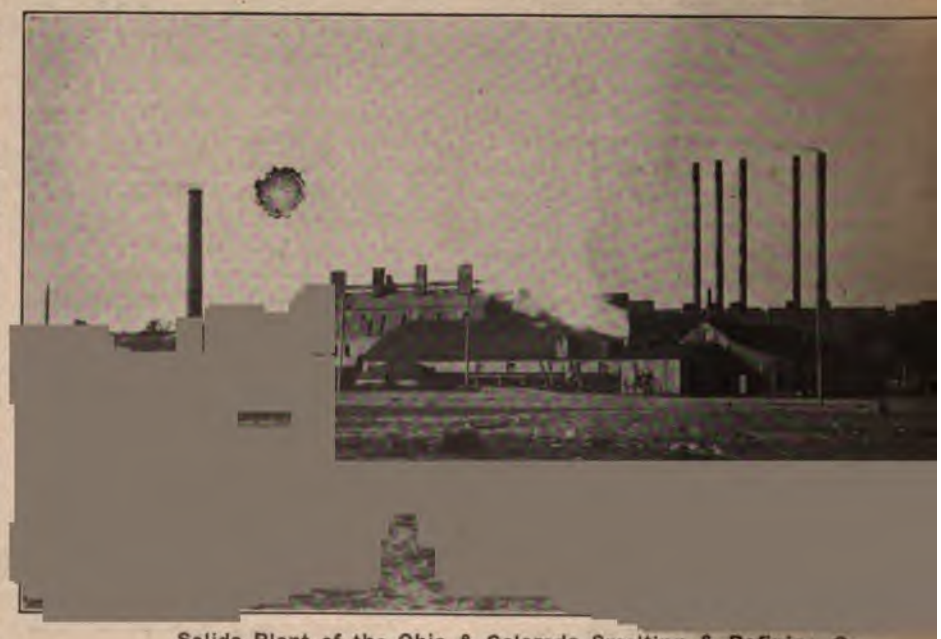
The plant of the Ohio & Colorado Smelting & Refining Company, known as the Salida smelter, and situated about two miles from the center of the city, is the result of the increasing production of the mines in that vicinity. As an outcome of the erection of the smelter seven years ago and a corresponding decrease in smelter charges, the opening of other mines and increased production has necessitated a constant enlargement of the smelter's capacity, and at the present time, extensive improvements of the plant are being made. The ores treated by this lead smelter come largely from the Monarch district, west of Salida, which is principally lead, zinc and silver, and from the Turret and Whitehorn districts on the north with gold and silver values. The capacity of the smelter is about 1,000 tons per day, and they employ approximately 350 men, a large percentage of which form the smeltertown lying between the smelter and Salida.

The motive power used about the works is both steam and electric. At present the greatest percentage is steam, though it is understood that in the near future electric power is to be used as much as possible, and arrangements have been made with the city electric company for the supplying of the current. In the power house are two Corliss type engines, made by the Murray Iron Works of Burlington, Iowa. One is a 450-H. P. Compound Corliss, and the other is a simple Corliss of 300-H. P. These engines furnish the power for the Connerville blowers, of which there are four in all. Two of these are No. 7 with a capacity of 67 cubic feet per revolution, and the other two are No. 8 with capacity of 100 cubic feet each per revolution. The blowers are placed to the side of the engines, hence a clutch and shafting arrangement is used, with a rope drive from the engine to the wheel on the shafting. By this arrangement any piece of the machinery can be thrown out or in as desired. For running the electric generators, which at present furnish current for lighting and the motors running the sampler, a 90-H. P. Ideal, built by the Ide Engine Company of Springfield, Illinois, and a 75-H. P. Watertown, built by the Watertown Company of Watertown, New York, are used. Both are compact in form and require but little floor space.

Practically all of the Ohio & Colorado smelter, when installed, was equipped by the Colorado Iron Works of Denver, and hence the sampler consists of Colorado Iron Works crusher, rolls, etc. The crusher is of the special Blake-Dodge type, from which it goes to Improved Standard rolls. These rolls are provided with a spring mechanism which prevents breakage by any foreign substance in the ore, yet still have such a resistance that they give the same effect as a rigid roll. From these rolls the ore is discharged into an elevator, which empties into 3x3 impact screen with a motion perpendicular to the plane of the screen, produced by two racket cams. The oversize from this screen is delivered to a second pair of rolls, similar to the first pair, but set to crush finer, while the undersize goes through the sampler. The sampler is of the Vezin type, and delivers the chosen part to an elevator which empties into a bin. From here it may again be run through the rolls (set finer) and sampler. From the sampler the remainder of the ore drops to a conveying belt and is deposited into bins. From the bins if non-sulphide, the ore goes directly to the bedding bins near the blast furnace, but if sulphide ore it first goes to the roasting house. This building contains twelve hand roasting furnaces, also designed by the Colorado Iron Works. These furnaces have but one fire box, which is at the discharge end, and have a width of hearth of 16 feet. Over all the dimensions are 18 feet wide by 70 feet long. The charging end is equipped with a conical shaped receiver into which the ore is dumped from a track running above the furnaces at the charging end. The ore is worked by hand requiring about two men to each furnace. The discharge is effected just in front of the fire box, and the roasted ore dropped into conical pots, from which the mass is dumped into railroad cars and sent to the bins near blast furnace. The capacity of each roaster is six charges of 4,250 lbs. in twenty-four hours or a total capacity of 25,500 lbs. At one end of the roasting house an H. & H. converter is being installed as an experiment in the roasting of the ores.

A railroad track runs over the bins near the blast furnace, and carloads of material are dumped into their respective bins. The limestone is obtained from Garfield, Colorado, while the ore, as previously stated, comes principally from the mining districts in the vicinity of Salida. As is customary in lead smelting practice the ore is bedded and charges calculated from the composition of the beds. There are six blast furnaces, two of which have eleven tuyeres on a side, and measure 48x180 inches, and four which have but eight tuyeres on a side. Each has a large hood over the fore hearth to carry off the fumes and smoke. When the slag is tapped from the fore hearth into the slag pot there remains after dumping a shell containing values, which is cooled, broken up and dumped into a car, and this car is run up an incline, where it is dumped into a bin on the level of the charging floor and the shell again runs through the furnace. The matte is taken from the molds after cooling and dumped into a car, in which it is taken to another part of the works, put through a crusher, mixed with the roasting ore and run through the roasters. The product from the lead well is run into a conical pot from which it is run directly into bullion bars in the molds placed on a truck and run underneath the spout. A new flue has just been completed, and is working very satisfactorily in every respect, being designed according to the latest and best practice.

The management of the Salida plant is not only efficient, but they combine tact with smelting. The improvements and additions which are being constantly made, stamps them as capable and progressive, and proves they are experiencing the success they deserve.



Salida Plant of the Ohio & Colorado Smelting & Refining Co.

Mining Letters from Correspondents

Mines and Mining Wishes to Secure an Actual Reputable Correspondent from the Mining Centers of the World

Denver

Jan. 2, 1908.—The new year steps across the threshold with light heart and cheerful activity. The country is in shape to continue its rapid strides in the march of progress, and Colorado stands in the front rank of this marvelous sisterhood of states. During the past year she added her full quota to the wealth of the nation, and the happiness and prosperity of her own people.

Colorado stands without a peer in the realm of earth's resources, diversity of industries and latent wealth inviting development. If she is not already, in two decades she will contain the richest per capita population of any similar geographical area of the earth. Her mountains and valleys are the inexhaustible treasure vaults of the continent. They are overflowing with the primitive elements that make a rich, contented and law-abiding people. Her mountains abound in marvelous diversity of mineral wealth, and her valleys are extremely rich in the elements of agricultural fertility. Gold, silver, copper, lead, zinc, iron, tungsten and other rare minerals, abound in great abundance. Coal, coal oil, gypsum, fire, potters and common brick clays are being developed in scores of places within the confines of the state. The finest marble, granite and the more common building stones mark the mountains at many points. Vast water powers are being utilized and the genius of man is taking advantage of all these opportunities and turning their productions into the channels of trade and commerce.

Colorado has made wonderful progress in the last decade. Men of great ability have taken hold of some of her boundless resources, and are waking up many of the hitherto solitary places with the hum of industry and enterprise.

W. B. Ridgely, comptroller of the currency, gave out the following encouraging statement on the last day of December, which indicates that the country is not going to pieces financially or any other way. He declares that the whole world has been overtrading and expanding, and nowhere has it been more rampant than in the United States. The reaction was inevitable, and though it might not have taken the form of a bank panic had we been better prepared with such a banking and currency system as we should have, the time has come when some or all must pay for our overindulgence.

"It is the duty of the banks," says the comptroller, "to restore business to normal conditions by resuming their functions as promptly and as fully as possible. Fortunately there is not only the strongest desire and disposition on the part of the banks to do this, but conditions are such as to make it comparatively easy and to lead us to expect a much more prompt recovery than has followed other similar financial crises. The report to the comptroller show that the reserves in the central reserve cities were but 22.2 per cent. against the legal requirement of 25 per cent.

The forty reserve cities show 24.72 per cent. of legal reserve or almost the full legal minimum, while their total cash means are 26.55 per cent. of their deposits.

Of the forty cities, twenty-one show legal reserves above 25 per cent., while ten of them show over 30 per cent. of legal reserve, and all but eight of them show more than 25 per cent of total cash means. The largest reserves are in the Texas cities, Galveston and San Antonio showing 43 per cent. of legal reserve and Galveston over 48 per cent. of total cash means.

"The returns as tabulated by states are significant and reassuring as to the general conditions. There is not one state which does not show any excess of reserve above legal requirements of 15 per cent., and an increase in legal reserve and total cash means on Dec. 3rd above those held on Aug. 22nd.

"In the subdivision by states the Pacific states show the largest legal reserve of 22.28 per cent., while the western states show the largest cash means, 32.11 per cent. The most important significance of these figures is that the readjustment of bank reserves has taken place with so few bank failures.

"From Oct. 20th to Dec. 10th, 1907, there have been but sixteen suspensions or failures of national banks. Of those two have resumed and several more should do so in the very near future.

"The reports of the condition of national banks show that from Aug. 22nd to Dec. 3rd individual deposits decreased but $142,000,000, or about 3¼ per cent., while the decrease in cash on hand was but $40,000,000 and the increase in bills payable and rediscounts was about $42,000,000.

"We have had a very severe bank panic. It would have been much worse but for the aid given by the treasury department and some of the leading financial men of the country."

Cripple Creek keeps up her good work and reports an output for December amounting to $50,000 more than for the preceding month of November. The tonnage and gross values of mills and smelters follow:

	Tons.	Average Value.	Value.
Smelters.	28,000	$65.00	$ 182,000
U. S. R. & R. . .	22,000	27.00	594,000
Portland.	1,000	21.00	21,000
Golden Cycle. .	5,500	20.00	110,000
Isabella.	3,100	6.00	18,600
Ironclad.	3,000	2.00	6,000
Phoenix.	2,000	2.50	5,000
Joe Dandy. . . .	1,550	8.00	92,400
Other Plants. . .	1,000	3.00	3,000
Total.	50,950		$1,141,000

Reports just received from Goldfield, Nevada, are to the effect that the mine operators sent a representative to the Miners' Union leaders Tuesday with a message that if the union will make overtures on the basis of $4.50 and $5 a day wage scale, and the open shop system, the strike and lockout will be declared off and the mines will reopen in forty-eight hours. The union will hold a meeting tonight. The operators also promise that they will discharge their force of special detectives, now under command of Clarence Sage. The operators guarantee no discrimination and say that former employes will be given first positions. It is believed a settlement many grow out of the proposition. Both sides are tired of the deadlock and appear to be willing to meet each other half way.

Bisbee, Arizona

Dec. 27.—On Christmas eve the Bisbee local of the Western Federation of Miners declared the strike off by a vote of twenty-four to twenty-three. The strike has been in force since last March, although the miners had no chance of winning out. The directors of the Shattuck held their meeting to settle the erection of a smelter on last Saturday. They have decided to build a reduction plant at Douglas, this county, as soon as there is some improvement in the health of the money market. Nothing of importance has transpired at any of the Copper Queen properties.—The Calumet & Arizona officials deny the report that that company will increase their ouput at present. About twenty-five men are at present employed at the Shattuck-Arizona property on development work, which is mostly done on the 700 and 800 levels. Operations will not be resumed until a change for the bet-

ter in the copper market. Denn-Arizona has discontinued the use of their pumps, as they have found them unnecessary at present. Diamond drill operations are being carried on at the 1,100-level.—The new shaft at the Savage property at Paradise, this county, has been sunk fifty feet and is being well timbered. The depth of the Warren shaft has reached the 435-foot mark. No change has occurred in the formation. Superior & Pittsburg shipments continue at 600 tons daily. The new strike on the 770 level of the Junction shaft at present shows twenty-five feet of ore, averaging thirteen per cent. The No. 29 drift on the 1,200 level has thirty feet of sulphide ore running pretty high in copper. The report sent out from Michigan regarding a strike at the Briggs shaft of this company is erroneous.

City of Mexico

Dec. 24.—Minister of Finance, Jose Limantour, has just submitted to Congress his annual financial document, from which we extract the following:

The estimates of normal revenue in the fiscal year 1908-1909 and the aggregate of expenditure which Congress is asked to approve for the same year are as follows:

Estimates of normal revenue	$103,385,000.00
Total of proposed expenditure	103,203,824.63
Excess of revenue	$ 181,175.37

Fortunately, it is comparatively easy to ascertain the annual mining output, which is next to the agricultural output in magnitude. For our present object it is sufficient to get at the production of the precious metals and of copper and lead, which, together, undoubtedly represent more than 95 per cent of the total value of the mineral output.

The value of metals mined and marketed can only be calculated indirectly, for there are no statistics that show directly the yield of the mines. Nevertheless, bearing in mind the fact that the consumption of metals within the republic is comparatively insignificant, and that as fast as ore is taken from the mines, it is either treated or exported, for, in general, our mining companies do not allow their ore to accumulate, it is possible to arrive at a very approximate knowledge as to the volume of the output, whether we consider only the quantities exported or study those quantities in connection with the coinage returns and certain other data to which reference will shortly be made.

To begin with the production of gold, it may be said that if, from the total exportation of that metal, in all forms, we deduct Mexican and foreign coin, the difference, plus the gold bullion delivered by the smelting companies to the Exchange and Currency Commission, represents, with sufficient closeness, the volume of the production. The estimate thus formed will always be below the reality; but the factors left out of account are so inconsiderable that they can safely be disregarded.

In 1906-1907 the exportation of gold was as follows:

In Mexican coin	$ 29,990.00
In foreign coin	10,070.00
Gold bullion	18,905,646.10
Gold ore and gold in other forms	4,928,007.84
Total	$23,873,713.94
Deducting the amount exported in the form of coin, we get	$23,833,653.94
Add Mexican gold delivered during the year for coinage purposes to the Exchange and Currency Commission, according to the accounts kept by said Commission	12,730,244.30
Total production of gold	$36,563,898.24

As will be remembered, it was calculated that the production of gold in the previous fiscal year (1905-1906) amounted to $36,400,000, which, as compared with the showing of the years that had gone before, was considered very satisfactory, and it is gratifying to observe that there has been no halt in the output of this vital product.

In calculating the production of silver we have to go by the amount exported, which, in 1906-1907, was $99,861,790.06, deducting the pesos exported (for as no pesos are now coined, it is clear that the silver contained in the coins of that denomination sent abroad during the year under review belong to the production of other years) as well as foreign coins.

The exportation of silver during the year under review was as follows:

Mexican silver coins	$24,521,921.00
Foreign silver coins	161,829.00
Silver bullion	63,191,248.18
Silver ore and silver in other forms	11,986,791.88
Total exportation of silver	$99,861,790.06
Deducing the two classes of coined silver, the value of silver produced during the year and sent abroad figures out at	$75,178.040.06
Add the commercial value of silver bars of native production bought by the Exchange and Currency Commission during the year under review for coinage into 50, 20 and 10 cent pieces	1,910,786.94
Total production of silver in the year	$77,088,827.00

Comparing this amount with the estimate made a year ago as to the production in 1905-1906, viz., $75,605,605.27, it is found that last year a gain of $1,483,221.73 was achieved.

In the case of the white metal, which in this respect differs from gold, it is necessary to compare not only the values but the quantities of the output, seeing that silver, excepting that contained in hard pesos, varies constantly in value as measured in terms of the monetary unit, which is 75 centigrams of pure gold.

In the year 1905-1906 the mean value of silver in terms of the new currency, on the basis of 75 centigrams of gold per peso, was $41.36 per kilogram of pure silver, whereas in 1906-1907 the mean value was $43.94 per kilogram. So that the value of the silver production in 1905-1906, or $75,605,605.27, represents 1,827,988 kilograms and the value of the production in 1906-1907, viz., $77,088,827, is equivalent to 1,754,411 kilograms. As will be seen, the difference is not great.

The results obtained in the mining of other substances can only be presented in an official report by reference to the quantities and values thereof exported in the form either of ore or metals. Some of those products, as, for example, lead, are beginning to be consumed within the country on an appreciable scale; but, until the government succeeds in securing direct data as to the metallic production, it will be necessary to rely on the figures showing the exportation of the substances in question to foreign nations.

In order, as far as possible, to obviate repetitions and seeing that I shall have occasion again to refer to our production of metals when discussing our exports, I will only state here that the output of copper, and, to a still greater extent, the output of lead showed a marked falling-off last year, perhaps on account of the closing down of some low-grade mines; and that, on the other hand, zinc, antimony and various other mineral substances have been mined of late on a larger scale than formerly, thus furnishing new resources to our mining industry, whose mainstay for centuries was the winning of the precious metals.

Turning now to the statistics of the foreign commerce of the republic it is easy to take in, by a glance at the tables of imports and exports, the chief changes that took place in the year 1906-1907.

In regard to imports, the comparative returns for the last two fiscal years are given below, and it is to be observed that though the returns for 1905-1906 have been revised and rectified, while there has been no time for the same operation in connection with the figures for 1906-1907, the difference is not likely to be material:

CLASSIFICATION ACCORDING TO THE TARIFF OF IMPORTS.

	1906-1907.	1905-1906.		1906-1907. Differences.
Animal substances	$ 19,234,180.85	$ 16,319,191.42	+	$ 2,914,989.43
Vegetable substances	31,730,755.30	32,574,264.22	—	843,508.92
Mineral substances	82,871,771.52	90,743,251.67	—	7,871,480.15
Textiles and manufactures thereof	26,498,694.37	22,654,312.72	+	3,844,381.65
Chemical and pharmaceutical products	9,506,953.39	7,726,364.85	+	1,780,588.54
Spirituous, fermeted and natural beverages	7,296,233.52	7,264,826.86	+	31,406.66
Paper and applications thereof	6,027,056.36	5,437,920.47	+	589,135.89
Machinery and apparatus	27,735,743.65	20,410,722.73	+	7,325,020.92
Vehicles	9,000,308.49	4,595,157.58	+	4,405,150.91
Arms and explosives	3,907,928.42	4,122,865.80	—	214,937.38
Sundry	9,553,762.98	8,155,876.68	+	1,397,886.30
Total imports	$233,363,388.85	$220,004,755.00	+	$13,358,633.85

The foregoing imports are divisible as follows into free and dutiable goods:

Fiscal Years.	Free goods.	Dutiable goods.	Total imports.
1905-1906	$ 70,169,945.34	$ 149,834,809.66	$ 220,004,755.00
1906-1907	59,135,800.51	174,227,588.34	233,363,388.85
Differences	$—11,034,144.83	$+24,392,778.68	$+ 13,358,633.85

The attention is immediately arrested by the fact that free goods showed a falling off of eleven million pesos, while dutiable goods scored a gain of more than twenty-four million pesos. This difference admits of a simple explanation: Though in 1906-1907 gold and silver money coined in the United States was imported to the amount of twenty-three million pesos, that amount, though substantial, was considerably less than that which entered the country from the American mints in 1905-1906. The effect of the curtailment of this line of imports is also perceptible in the comparative figures which appear under the heading of Mineral Substances; and, though the falling-off is only $7,800,000, this simply means that there was an increase in the importation of mineral products other than gold or silver coins, for that falling-off is not equal to the diminution in the importation of coins.

There is nothing particular to be said in regard to the increase that is observable in the imports of animal substances, textiles and manufactures thereof, chemical and pharmaceutical products and in general all the great divisions into which the tariff groups imported merchandise, save that the most important increase took place in the class of articles which, perhaps more than any other, contribute to the development of the country, viz., Machinery and apparatus of all kinds, and that the second largest increase is in vehicles, doubtless owing to the heavy importation of freight cars and automobiles.

The same explanation as has just been given in regard to variations in the importation of Mineral Substances, due to the curtailment in the introduction of Mexican coin in 1906-1907 as compared with 1905-1906, also enables us to realize that the total increase in imports was considerably greater than the $13,358,633.85 shown by the tabulated statements. The value of general merchandise purchased abroad was assuredly thirty million pesos greater last year than in the year preceding it and this fact serves to throw light on certain difficulties that have since arisen in the exchange market and to which brief allusion will be made in due course.

The values of our total exports, as shown by the fiscal statistics were as follows for 1906-1907 and the preceding four years:

Fiscal Years.	Total Exports
1902-1903	$207,377,793.17
1903-1904	210,312,374.46
1904-1905	208,520,451.43
1905-1906	271,138,809.32
1906-1907	248,018,010.00

In order that these figures may be understood, it is necessary to split them up according to the main divisions into which the exports may be classified:

Fiscal Years.	Gold.	Silver.	Other Mineral Products.	Total Mineral Products.
1902-1903	$23,857,612.67	$ 77,554,713.04	$26,968,175.58	$128,380,501.29
1903-1904	24,312,303.35	79,110,689.72	29,419,033.74	132,842,026.81
1904-1905	28,361,881.26	65,523,645.70	36,418,451.13	130,303,978.09
1905-1906	31,695,777.38	125,400,083.77	35,613,324.84	192,709,185.99
1906-1907	23,873,713.94	99,861,790.06	36,510,500.10	160,246,004.10

Fiscal Years.	Vegetable Products.	Animal Products.	Manufactured Products.	Sundry.
1902-1903	$57,849,916.91	$15,262,830.99	$5,133,666.03	$ 750,877.95
1903-1904	60,548,679.50	10,871,318.22	5,528,072.97	522,276.96
1904-1905	59,076,269.53	10,505,119.11	7,869,959.34	738,125.36
1905-1906	62,928,135.51	11,723,425.23	2,978,441.02	799,621.57
1906-1907	71,810,374.51	11,151,928.02	3,766,493.72	1,043,209.65

Goldfield, Nevada

December 28.—By reason of the encouragement received from President Roosevelt this week, Governor Sparks has concluded to call a special session of the Legislature, which will convene immediately after the New Year. The troops will now be permitted to remain in Goldfield indefinitely or until it is evident they are no longer needed. It is hoped and believed that the presence of the troops and the extra session of the Legislature will have a quieting and reassuring effect upon all parties and that mining operations will soon assume their normal activity.

A telegram was sent to Senator Nixon of Nevada, who was in New York, from Reno in relation to retaining the troops and calling the extra session of the Legislature, to which Senator Nixon replied as follows: "I have no doubt that the Legislature will act in accordance with the wishes of the governor and the rest of the community and make a formal demand for the retention of the troops. Governor Sparks was entirely honest in his belief at the time he communicated with the President and said that he feared an extra session of the Legislature would be abortive, but public feeling has been so strong since that time that the Legislature will see its duty clear and perform it. Some legislative action on the strike will also be taken."

It is not expected the extra session will continue longer than a week and that it will result in a settlement of the disturbed conditions.

Late reports from Ely state that the 500-foot level of the Alpha shaft was reached by the rescuing force last week and more rapid progress is anticipated the remainder of the distance. The ground where the run occurred is still settling, however, and from time to time it will be necessary to fill in the space with cordwood. The entombed miners state today that they have enough provisions on hand to last them for three weeks. Owing to the frequent runs of earth that have occurred during the past three days it will probably be at least three weeks before they are rescued. The air confined for weeks in the manway, last night hissed through an opening made by a miner, proving that the time when a rescue of the men can be effected is not so far in the future as was at first thought. One danger above all others stares the rescuers in the face. A cave below the piled up muck and timbers on which they are working will render them helpless to cope with the existing danger and to guard against the workers being thrown to the bottom of the shaft each man works with a rope tied around his body and secured from above. If no cave-in occurs on the lower level Foreman Gallagher now thinks the men will be released within two weeks.

A suit has been brought in the United States District Court by the Goldfield Mine Operators' Association against the Western Federation of Miners, enjoining the local miners' union, which is affiliated with the Western Federation, from interfering in any way with the operation of the mines in the Goldfield district. It has also been definitely decided that after December

30th each individual mine owner, or each company operating a lease or mine, shall take care of his own property, independent of the association. This will necessitate the putting on of many more guards.

It is state positively that the surveying will start about the first of the year for the new railroad to be built from Ely to Goldfield and Tonopah by the Guggenheim interests. Its real purpurpose it to transport ore to the 10,000-ton smelter nearly completed at McGill, Nevada.

In spite of the dubious fall and winter so far, we anticipate a prosperous season, when business fairly begins to move and good order reigns.

Las Vegas, New Mexico

Dec. 30.—From Farmington, San Juan county, New Mexico, come reports that C. L. Tripp of Boulder, Colorado, and J. M. Edwards, an attorney of Farmington, have been trying to negotiate with the Denver & Rio Grande people and others to build a wagon road through certain properties lying in the placer belt extending from Farmington, along the San Juan river into the rich placer fields of Utah, a distance of 160 miles.

The writer prospected that region fifteen years ago, and found placer gold the entire length of the San Juan river from its source in Rio Grande county, Colorado, to its junction with the Rio Colorado near the southern boundary of Utah, a distance of 400 miles. Gold is strung all along that river. In the sands it is usually very fine, but in the gravel bars that dot the river on either side, it is coarser, and millions of tons of these bars will yield from 10 cents to $2 per cubic yard. The time is not distant when a thousand men will be gathering riches from these auriferous deposits.

Messrs. Tripp and Edwards report that they have organized a company and are already doing a profitable business, where one of the largest placer fields in the country is being opened up. They declare that pay dirt extends from Farmington along the San Juan river to its junction with the Colorado, a distance of over 200 miles. Gold is also found between the Blue mountains on the north and the Carrisos on the south. All of the sand on the mesas reaching over this vast scope of territory is said to carry values in flower gold running from 50 cents to $2 per cubic yard.

"We have tested the entire territory in question," said Mr. Tripp, "and I am outfitting a company which will put in a placer plant costing not less than $100,000. We have a small plant working on the San Juan river now which has been handling from twenty to twenty-five cubic yards of dirt per day, realizing between $1.50 and $2 per cubic yard. This is very profitable under the process we use, which is entirely new. It only costs us about 6 cents per cubic yard to handle it.

"Our process is not patented, but it contains some secrets. It is the only one I know of which will save the values in flower gold. It is usually deemed impossible to save these values and an ordinary process would not do the work. Our machine is really a combination of several others, consisting of a boiler, pump, rotary screen, etc.

"Our operations are being prosecuted on the mesas above the San Juan river, is what is known as San Juan valley. We pump water a distance of 2,500 feet from the river and 500 feet in the air. The sand is very fine and it takes a 30-mesh screen to do the work. The gold is finer than the sand and floats in the water, being typical flower gold. This is what makes the operation of saving it so difficult."

Investigations in this vicinity have been going on for some time. The territory extends up to the Colorado line, and the tests in the country outlined are said to have revealed pay dirt throughout the entire territory. It will be necessary to build a wagon road over a greater part of the 160 miles, according to Mr. Tripp, who has just returned from the territory. He says the privilige of extending the road through the government Indian reservation has been procured, and thirty-five miles have already been built in one stretch and seventy miles in another.

He anticipates important developments from the district and says the new plant to be equipped by his company will handle 1,000 cubic yards of sand per day. There are now six companies operating in the field.

In his annual report to the Secretary of the Interior, Governor Curry earnestly recommends legislation that will permit the territory of New Mexico to select lieu lands, in the place of sections sixteen and thirty-six, that are located within the land grants, from any portion of the public domain in the territory, instead of being compelled to select such lieu sections in the vicinity of the land grants, as is now provided. This would enable us to get better land, and I think that the schools need this assistance and are entitled to it.

"I desire also to earnestly recommend the admission of New Mexico to statehood at the earliest practicable date. We have sufficient population and wealth, and our citizens are law-abiding and most loyal to our government, and they are entitled to the full rights and privileges of American citizenship."

Judge Ira A. Abbott in the District Court yesterday consolidated the numerous actions brought by John Kennedy of Gallup against the Union Coal Company and the Gallup Fuel Company and issued a decree to the effect that Kennedy deposit over $1,000 with the clerk of the court and the companies deliver deeds to the property, the sale of which was sought to be enjoined by Kennedy on the ground that it defrauded him of his rights in the premises, the company having expressed its willingness to make the proposed sale to Kennedy instead. Maynard Gunsel is dismissed as a defendant in the case. The whole matter is a rather complicated one, the plaintiff alleging in general that a proposed transfer of properties by the Union Coal Company to the Gallup Fuel Company was a plan to "freeze him out."

Col. D. K. B. Sellers, who with M. W. Flourney and other Albuquerque men is interested in mines in the Crackerjack district of the Death valley, Nevada, mining field left for the Crackerjack in response to a warning wired from that place that some of the disaffected miners in the district were preparing to jump all the claims they can get their hands on immediately after midnight January first. The story is that the miners intend to destroy all monuments as soon as the year has expired during which the owners are expected to do the necessary assessment work to prove up on their claims. They will then relocate claims on the spot and contest the ownership of the properties. If such a plan is in contemplation it would mean endless trouble for the mine owners and concerted action it is said will be taken by the latter to protect their property.

"Six or eight owners will join me at Crackerjack and we will camp out New Year's eve on our claims,' said Col. Sellers yesterday. "We will establish an armed patrol and if any claim jumpers appear we will try and give them a proper reception."

"Scotty" of Death valley fame and a party of gun fighters from Goldfield, are expected to take the field against the would-be claim jumpers .

The gold output of India for August is reported at 47,640 ounces, the largest in nine months. For the eight months this year the production totaled 361,118 ounces, which compared with 387,020 ounces for the corresponding period in 1906, shows a decrease of 25,902 ounces, or 6.6 per cent.

Movements in Mining Camps of World

Only Authenticated Reports Will Be Admitted to These Columns

ARIZONA

Cochise County.—It is stated on authority that the Denn-Arizona company is not planning the immediate construction of a smelter, but that the erection of a reduction plant is a certainty for the near future.—It is reported from the Lake that the Calumet & Arizona earned just about the $1.50 per share dividend declared for the last quarter. The mine is producing only about 50 per cent. of normal, but it is said that it is proposed to gradually increase the output and put the mine in shape to earn and pay $3 a quarter, even with the metal at 13 and 14 cents a pound.—The Bisbee Sonora Development Company have received good ore from their properties in the Chiricahuas during the past week, coming out of the 150-foot tunnel. Mr. Calvin, having charge of the work, states that the entire breast of the tunnel is in ore and the ground has been much softer during the past two weeks.

Graham County.—The Gold Belt Development and Reduction Company recently shipped two carloads of high-grade ore to the Shannon smelter for treatment. The company is also beginning the shipment of excellent quartz ore running well in gold.—The plans for the erection of a mill have about been completed and it is expected that at the directors' meeting, which will take place early in January, some definite action will be taken in the matter.—The New England and Clifton company will probably ship several carloads of ore weekly to the Douglas smelters in addition to what they are shipping daily to the Shannon.—The New York-Arizona company is going along in full blast with development work.—The labor difficulties of the Arizona Copper Company at Clifton, have been satisfactorily adjusted. The company has stopped one of its concentrating mills, but all the furnaces are in full blast.—The Standard copper mines are making regular shipments to the D. C. smelter at Morenci. The force on development work has been curtailed considerably, although about the same number of men as usual are employed in taking out ore for shipment.—During the first two weeks of the present month the Arizona Copper Company smelter has maintained an average daily run, which, if kept up the remainder of the month, will place the December output above the 1,500-ton mark, thereby making the banner tonnage the last month in the year.

Mohave County.—The Victor Gold Mining Company will place its large automatic cyanide plant in commission at an early date.—A forty horse power boiler is being put on the main shaft of the McCracken mines where the Palo Verde Mining Company is cleaning out the old drifts, timbering up the openings and preparing for extensive winter development.—Owing to the uncertainty of the future of the Gold Road mine, near Kingman, Superintendent S. R. Porter has tendered his resignation and Col. H. G. Heffron has been sent out by the company to take the vacant place.—The American shareholders want a modern plant, thus cheapening the percentage of saving in the cyanide department. The French people oppose this innovation, and as a result there is a strong probability of the property closing down the first of the year.—J. D. Spargo has taken a lease and bond on the old Brown mine, at Stockton Hill, from the C. O. D. Mines Company, and went out there to begin work. He will keep a small force of men at work on the mines all winter and after the cold weather blows over will add to the force.—Bullion is being shipped from the Cedar mill, where the Benedictine Mining Company is operating the cyanide plant on tailings. It is reported that this company will reorganize early in the new year and take over the holdings of the old Cedar and Benedictine companies.

Pima County.—The Imperial Copper Company has twenty-two machine drills in operation and is blocking out a large tonnage from its mines in the Silver Bell district.—The Tucson Consolidated Copper Company has reduced its force, concentrating its energies on the Old Pueblo group where the main shaft has reached a depth of 175 feet and will be sunk to the 500-foot level.—The Weldon Gold and Copper Mining Company in the Quijota district has now an abundant supply of water for its two mills and is extracting a considerable quantity of gold and silver ore worth about $40 a ton.—A fifteen horse power gasoline hoist has been installed on the group called the Bob Leatherwood property which has passed into the hands of a syndicate by Col. Epes Randolph.—The Boston group of six gold bearing claims, owned by F. J. Villaescusa of Tucson, and located in the Baboquivari district has two shafts down forty-five feet which are being worked with one shift.—On the Allison gold property near the Boston, and owned by Frank and Warren Allison of Tucson, three shifts are cleaning out the old workings and drifting both ways on a vein which assays as high as $700 a ton in gold. Principal values are in gold, small streaks assaying as high as $700 per ton.—The Santa Rosa Copper Company is working two shifts on its property forty-five miles west of Tucson, where a shaft is down over fifty feet and a tunnel is in sixty-five feet in a horizontal direction and 300 feet under a vein that outcrops on the surface for a distance of three miles.—At the Armagosa property of the Calumet & Arizona company, in the Pima district, the diamond drill work of the property has been completed, at least for the present, and work is being pushed to further prove out the knowledge gained as a result of deep drill work. The principal workings are down about 300 feet, with a crosscut of 280 feet to the ore body from the main shaft.

Yavapai County.—As soon as the Mescal Mining Company completes the new road it is building from Deception gulch to its property in Mescal gulch, machinery will be hauled to the ground and development begun.—It is reported that the Yavapai Oil and Development Company in drilling for oil has struck gold in the Del Rio district assaying $200 a ton.—Superintendent Henderson of the Arizona Mining and Milling Company has purchased a hoist and other machinery in Prescott for the Fitzhugh Lee tunnel where twenty-five miners are pushing the tunnel through the Express mine, owned by the Cardinal Mining Company, as well as running the upper tunnel about 800 feet from its mouth, where a winze is being sunk on a very rich ore shoot.—The third gold bar of the month, valued at $2,500, has been brought in to Prescott from the property of the Mount Elliott Consolidated Mines Company, the result of a recent run by the ten-stamp mill.—Paul Mitchell and William Speed, who are working a silver-gold property known as the old Jackson mine, north of Hot Springs, have made a good strike recently and have brought to Wilcox samples which assay $317 to the ton.—J. B. Cleaveland, general manager of the Arizona Central Cop-

per Company, operating on the western slope of the Black Hills, said recently: "The Shylock shaft is now down 365 feet and one of the latest assays taken of samples of the ore body in the bottom gave returns of fifty-six ounces in silver and 7 per cent in copper."—The Haynes Copper Company has purchased a plant of 350 horse power, with a double drum hoist, and an air compressor powerful enough to run twelve drills. The plant cost $15,000 on board cars at Los Angeles.—The long tunnel at the United Verde mine is now in 2,525 feet, and is being driven at a rate of eleven feet a day.

Yuma County.—An involuntary petition in bankruptcy has been filed by the creditors of the Comanche Mining and Smelting Company against that concern. H. F. Ellard of Silver City, has been named as the temporary receiver. The defendants represented by Percy Wilson, of Silver City, have filed an answer.—The Little Dutchman group of mines owned by McMahon and Thomas Bouse, has been bonded to Michigan capitalists for the sum of $100,000. The Michigan people have also taken over the Reid mine, a copper proposition, and the Old Maid, a gold mine. The Bouse district is reported very prosperous.

CALIFORNIA

Contra Costa County.—The Guggenheims, for their American Smelter Securities Company have taken an option on 1,500 acres on the Straits of Carquinez, near Martinez as a site for a new smelter.

Inyo County.—A tunnel is being driven on a ten-foot ledge running $10 a ton at the Black Canyon property. Surveyors are at work for the patenting of the ground.—Two veins, one thirteen feet wide and assaying $12 a ton, and the other from one to four feet wide and running $67 a ton, are being developed at the True Fissure.—The tunnel at the Killian mine on Bishop creek, now in 300 feet will be driven with the aid of electricity from the Casa Diable power station on Owen river.—Ore running as high as $300 a ton is reported to have been struck on the Bishop-Ellis group in Marble Canyon, the ore being a silver-lead.—The Buckeye Mining and Smelting Company is sinking a double compartment shaft at its property on Poverty hill, where if conditions warrant, a modern reduction plant will be erected.—Many prospectors are locating in the White Mountain district in which sensational strikes are reported.—A nine-foot vein of ore assaying $35 a ton has been encountered with diamond drills at a depth of sixty-five feet on Bishop creek.—A rich strike is reported at the old Cerro Gordo mine, near Keeler, where the smelter is being rebuilt and will soon be in operation.

Placer County.—Nearly forty men are at work at the Buckeye and Slope mines in the Auburn district and the compressor and machinery are on the ground.—H. J. Jarvis is developing with three men the Gray Eagle tunnel now known as the Mickey Free mine. The work until the money situation clears will be confined to cleaning and timbering the workings.—At the Hidden Treasure ground has been blocked out and gangways opened up so as to clear a large area for the operations of the miners.

San Bernardino County.—A shaft down fifteen feet on the Todd lease on the Owl claim in the Bonanza Mountain section, encountered a ledge which widened out from six inches to over three feet, picked samples running over $1,000 in gold, but the average estimated conservatively at $20 a ton.

COLORADO

Boulder County.—The Lehigh Tungsten Mining & Milling Company, incorporated under the laws of Colorado with capital stock of $75,000, of which $50,000 has been sold and issued, the balance of $25,000 remaining in the treasury of the company as a reserve fund, has purchased three groups of mining claims, two near Boulder Falls and the other in Bummer gulch, and has secured the old Coburn mill near the foot of Magnolia hill, which will be entirely reconstructed on plans formulated by Manager Stahler and the machinery for which has already been contracted for.—The Dalton Oil Company, a close corporation recently organized by Boston and Boulder men, has placed orders for machinery with which to sink a new well on the Orcini tract east of Boulder. The Dalton well located nearby is already earning the company eight per cent dividends.—Samples from a vein, the width of which has not been ascertained, in the east drift, twenty feet from the crosscut on the Atlantic vein in the Five Points tunnel at Summerville, assayed from 60 to 100 ounces gold and over 25 ounces silver. The lease is operated by Cross and Gustafson.—The Wolf Tongue mill shuts down for indefinite period, awaiting better financial conditions and resumption of steel mills.—Charles E. Bonnell of Sugar Loaf has closed a deal which has been pending for some time on a group of five patented tungsten claims one and one-half miles south and west of Sugar Loaf, the money for the first payment being already deposited, amounting to a considerable sum not to be made public at this time. He is also about to close a deal for a large figure on the Ragged Top, Lafayette and Song Bird claims of Sugar Loaf.—Philip Bauer & Co. at Clarasdorf are employing between forty and fifty men at their mines and mill, which are located on the Rogers tract.—Manager Kenneth McDonad has added to his force on the Lucy Thompson group adjoining the townsite of Ward, and will push development in the main tunnel of this line property. The tunnel breast is now about 300 feet from the portal and is being run in a body of mill ore having gold values of $8 to $12. The vein is twelve to fourteen feet wide.—New York owners of the Lulu B. at Ward have put on a force of men and will prosecute development throughout the winter.—Manager Burnhart made a shipment of ore from the 150-foot level of the Nelson at the head of Spring gulch, north of Ward, for test in the Hathaway mill at Denver, to ascertain adaptability of that process to the separation of the tungsten from the auriferous iron.—Drifts are being run easterly and westerly on the 125-foot level of the Lottie at Sunshine, that to the west being run to intersect the big copper dyke where Manager Van Kuren expects to encounter a shoot of rich ore.

Chaffee County.—Almost all assessment work has been completed in the Turret district and Senator Teller's bill will be of little benefit here.—A small station has been cut at the intersection of the crosscut and vein on the Saint Paul and the drift on the vein is now in progress.—At the Banker mine at Winfield a sixteen-foot vein was recently struck in the big crosscut tunnel which is being driven at a distance of 2,300 feet from the portal, at a depth of 1,500 feet, and assayed $80 a ton in ruby silver.—The Songbird Mining Company has encountered in a 200-foot tunnel on its Tom Paine claim near Salida, an ore shoot which contains twelve inches of fine galena and eight inches of quartz carrying good values.

Clear Creek County.—The Bi-Metallic Tunnel & Mining Company, with holdings on McClellan mountain, where it has advanced a tunnel for 900 feet on a vein, will install a powerful plant of electrical machinery early in the coming year.—Two machine drills have been received at Idaho Springs for the King Bee properties in the Newhouse tunnel, one for the Galatea and Summit mines of the Peniel Trust Company of Denver

and one for the Old Town mine and Hot Time lateral in the Newhouse tunnel.—It is reported that a number of idle gold properties in the Idaho Springs district will be opened up again in the next few months.

Dolores County.—The remodeled Pro Patria mill of the United Rico Mines Company has been put into operation and will treat the output of the mines until increased development necessitates a larger plant. According to reports sent to headquarters by A. Sheard, assistant general manager of the United Rico Mines Company, at Rico, Colorado, ore taken from the Jumbo No. 3 vein in the Newman Hill district, assays one ounce in gold to the ton, 178 ounces of silver, seven per cent. lead, twelve per cent. zinc, and 2¾ per cent. copper. The gross estimated value of this ore is $146 a ton and the vein from which it is taken is said to be one foot eight inches thick.

El Paso County—It is announced by Leonard E. Curtis of the firm of Curtis & Hine of Colorado Springs, engineers for the Central & Eastern Colorado Power Companies, which are affiliated and which are building enormous power plants at Glenwood Springs and Boulder, that the Central Colorado Power Company capitalized at $22,500,000, will, as soon as it is possible to work to advantage in the mountains, reinstate its force of 2,000 men laid off at the beginning of the financial stringency and push its gigantic undertaking to completion.

Fremont County.—The Union mill at Florence is treating 400 tons daily which is more than it received before closing down in April, and when larger car contracts are received the capacity will be further increased by 100 tons. The new rate recently made by the company is inducing many holders of large bodies of low grade ores to ship their dump rock to Florence.

Gilpin County.—Manager Kimball of the Old Town Consolidated Company, gives the following figures for production of the past year, with the exception of the last ten days of the month: Receipts for ores, $209,835, of which $106,575 was taken out on company account and $103,260.50 by leasers; shaft sunk 790 feet is now down 2,200 feet, Hot Time lateral from the Newhouse tunnel driven 2,492 feet to connect with bottom of Old Town shaft, and 2,170 feet of levels run off. Sixty tons of smelting ores sold for $5,000 and shipments from the tenth east level have been giving average returns of over $160 per ton.—The Metallic Exploitation Company, operating a lease on the Edgar mine in the Newhouse tunnel, has declared a second dividend of 1 cent a share, payable January 2d.—Eastern people have taken an option on the Egyptian in Illinois Central district and are arranging for active operation. Leasers have been working it for some time and have taken out fair ores. New machinery will be installed.—Eastern owners of the Colorado-Garr, on Bobtail hill, will install an air compressor and sink their 1,000-foot shaft, as well as lease the upper workings.—An electric hoist is to be installed within thirty days at the West Calhoun of the Jefferson Calhoun Company.

Gunnison County.—It is reported that the old C. F. & I. coal mine at Floresta, in the Ruby district, ten miles from Crested Butte, is being reopened. The fans have been running for several days and the mine is now well ventilated.—The Crested Butte Coal Company is outputting about 300 tons of coal a day, the company having built a spur to the foot of the tram by which the product is delivered directly from the mine to the cars.—Salisbury & Hohizel are waiting for a heavy snow to take out over 100 tons ready for shipment in the Spring creek section.—Considerable development has been done on the Sodja coal mine. A nine-foot vein of coking coal has been opened which is said to equal the C. F. & I. Company's.—Mergelman Bros. have finished their assessment work on the North Star lode in Kezar basin. Forty tons of ore were shipped at a profit from this property and it is looking very well.

Lake County.—The Penn property in the Leadville district is producing over 200 tons daily of ore and iron, the latter being much desired by the smelters for fluxing purposes.—A goodly tonnage of gold ore is being sent to the smelter from the Ready Cash tunnel on the Aurora group in Iowa gulch.—Some of the ores from the Grandview property in Empire gulch runs as high as seventy-six per cent. lead.—Manager R. B. Estey is pursuing development at the 400-foot level of the Bessie Wilgus.—Casey and Nelson have taken a lease on the St. Louis tunnel in South Evans gulch and are getting out an occasional shipment of gold ore. They are also keeping a few men employed on the Crown Point on Rock hill.—The Ibex mine is now giving employment to 300 men, distributed among some seventy sets of leases.

Mineral County.—A. Weaver and R. Fisher are on a drift 121 feet from the portal of the Judson tunnel where the vein is fourteen inches wide and increasing with advance.—The Humphreys mill finished their cleanup last Sunday evening and is now closed down. The mine and mill will resume operations as soon as the price of lead and zinc will permit the handling of the ore at a profit.—The Amethyst mill continues to grind with three shifts, but will not ship any more of their zinc concentrates.

Ouray County.—The new Camp Bird mill in the Sneffels district has been extracting 95.04 per cent of the values from the ore. Between $5,000 and $10,000 in gold bullion is sent in to Ouray daily.—Thirty additional stamps will be put in the Atlas mill during the coming year.—Machinery has been purchased for the new mill of the Torpedo-Eclipse and will be installed in the early summer.—The ore body in the Mineral Farm has proven to be a blanket or contact vein, varying from twenty to fifty feet in width, with values averaging $20 a ton.—At the Thistledown mine on Mount Hayden about 600 feet of development work has been done. A mill is in contemplation for the summer.—At the First National across the Uncompahgre gulch south of the city a mill is in contemplation for the near future.—The Teller Mines Company has just started up with a force of men with Rex Ridenour in charge. Money enough to work the property during the year has been put up by local parties. The work will consist of a tunnel to be driven 5,000 feet for the purpose of cutting the vein and prospecting the entire hill.

Teller County.—Five cars of ore of grades from one to four and one-half ounces in gold to the ton, have been sent from the Stratton's Independence property on Battle mountain. Two of the cars were screenings and were mined on company account from the large stope on the 200-foot level. The Beacon Hill Development Company, operating on the Mabel M. of the Gold Dollar property on Beacon hill, is breaking ore of a three-ounce grade from a vein measuring from three to four feet between walls.—Becker and Travell, operating on the Christmas mine on Bull hill, have uncovered an ore body almost five feet wide, from which the coarse rock is returning better than $20 and the screenings going $50 in gold to the ton. The vein was encountered by the lessees drifting in a westerly direction at a depth of 1,110 feet.—W. H. Hill, leasing on the Wrockloff of the Pharmacist ground on Bull hill, is breaking ore ranging from two to five ounces in gold to the ton at a depth of 135 feet. The ore body is showing a width of from one and one-half to almost three feet between walls.—The Western Star Mining Company, operating on the Western Star claim on Galena hill, has made an important strike at a depth of 130 feet. Assay returns show values of from $14 to $46 in gold to the ton and the vein is being

broken four feet across.—Philip Schuch and associates, operating the Friday claim on Tenderfoot hill, have the new shaft down eighty-five feet and will continue sinking.—Mishey and associates, subleasing from John Sharpe on the 300-foot level of the Abe Lincoln property of the Stratton estate in Poverty gulch, are now breaking ore ten feet wide and are getting returns of from $25 to $35 in gold to the ton.—Price and associates, operating on the Ajax No. 7 on Battle mountain, are reported to have opened up a new ore body almost two feet wide at a depth of 150 feet. Several assays were taken and returns showed values of from $17 to $42 in gold to the ton.—Ore of grades ranging from $20 to $110 in gold to the ton is being broken from a four-foot vein at a depth of 546 feet in the Forest Queen property on Ironclad hill. A four-car shipment was sent out last Sunday.—The ore body opened several weeks ago by John Sharpe and associates on the Little Diamond claim of the Blue Diamond Gold Mining Company on the west slope of Battle mountain, has widened out to almost three feet and gave returns of from $22 to $300 in gold to the ton. Sharpe has ordered a new plant of machinery, which is expected to arrive within a few days and a modern hoisting plant will be installed.

CANADA

British Columbia.—According to the official annual report of the Granby Consolidated, it cost that company for the fiscal year ending June 30th last 10.13 cents per pound to mine, smelt, refine and sell its copper.—The normal cost of the copper of the Dominion Copper Company is figured at 10½ cents per pound, but for the fiscal year ending July 31st last, with all the drawbacks encountered, it cost the company approximately 14 cents per pound to turn out its copper.—A car of steel has been received at the Rawhide mine, coming direct from Pittsburg.—The Dominion Copper Company has now about a thousand tons of coke at its Boundary Falls smelting works.—During the month of October the Granby Company sent out something like 90,000 tons of ore—one of the largest months in its history.—C. P. R. men have finished the new spur track for the Granby's Gold Drop-Curlew outlet.—A carload of concentrates from the Cariboo-McKinney mine was recently shipped from Bridesville, the nearest railway point, to the smelter at Everett.—A shipment of thirteen steel ore cars was received at the Granby mines direct from Pittsburg, being for use at the 400-foot level for the Victoria shaft outlet.

MEXICO

Aguascalientes.—The Asientos Copper Company, in which Harry Rab and others of Mexico City are interested, continues its shipments to the Aguascalientes smelter, and is installing a hoisting plant and opening up the known ore bodies, preparatory to heavy production when the price of copper recovers.—The Compania Minera El Misterio y Anexas is extracting copper ore, but is storing it at the mine, also in anticipation of higher prices for the metal.—The Minas Tepezalanas, belonging to the Guggenheim interests, were closed for several weeks, and the opportunity taken advantage of to do needed repairing and adjusting. These mines have now resumed full operations.—The Santa Francisca, also a Guggenheim property, is still out of commission, ore extraction not having been resumed since the disastrous underground fire of last summer.—The Compania Minera El Tabor y Anexas has something new in this district in a strong vein of lead carbonates carrying silver and gold values, which is being shipped to the plant of the Compania Metallurgica Mexicana at San Luis Potosi.—At the mines of the Aguascalientes Metal Company, at Asientos, formerly one of the heaviest producers of the district, no work is now being done except that of pumping.—The Compania Minera La Fortuna at Tepezala still has a large force of men at work extracting ore for shipment, but all development and dead work has been stopped. This mine produces the highest grade copper ore in the state.—William Davidov, manager of El Rico Mining Company, of Asintos, who is now in New York, has shipped a carload of machinery for the top works of this copper property, and will follow the shipment in person after the first of the year.

Chihuahua.—The production of Parral for the week ending December 21st was 6,350 tons.—It is said on the best authority that the Minas Tecolotes y Anexas, operating at Santa Barbara, Chihuahua, has curtailed its force, about 1,000 men having been let out.—Advices received state that a strike of rich ore of great extent has just been made in the Lepanto mine in the Naica district.—The Rosario Mining and Smelting Company has obtained from Governor Sanchez a concession for a smelter of thirty tons daily capacity at its property in the Vrique district, and a dam for power purposes on the Urique river. Ten years' exemption from taxation is granted.

Durango.—About forty prospectors, Mexicans and Americans, are reported to be placer mining for gold in this state.—In the neighborhood of 200 men employed at the Mapimi smelter of the Compania Minera de Penoles have been laid off from their work temporarily. The ores for the smelter are received from the Ojuela mines, owned by the Penoles Company, said to be among the richest silver-lead mines in the republic.

Guanajuato.—Bryant-McIlhiney interests will reopen and develop the La Luz group and the Bolanites and Refugo mines in the La Luz district and also erect a 1,000-ton reduction plant. Big capital will be needed for the enterprise and the company to be formed will have a preferred stock issue of probably $4,000,000, gold. The Refugio mine has been for some time the property of Mr. Bryant and associates, and months ago contracts for the purchase of the La Luz group and the Bolanitos mines were made. Considerable money has already been paid. The total purchase price to the company will be about $1,500,000.—The returns from the Santa Natalia mine, owned by the Shapley Engineering company, are better than ever before in the history of these mines.—Robert L. Armit has applied for twenty pertenencias for a mine to be called "Pinguiquillo," situated in the mineral district of Cardones, Guanajuato.

Guererrc.—The general superintendent of the Tennessee Copper Company, R. I. Stevens, and its consulting engineer, W. Harvey Weed, of New York, are examining properties held under option by the company in the Chilpincingo camp in the Balsas river country.

Hidalgo.—The Amalgamated Mining and Milling Company of Hidalgo, in order to take care of the ore which has accumulated at the mines of the company and which is purchased from mines with whom it holds contracts, have concluded to start operations at the San Diego mill at El Chico.—This mill has been idle for the past two years, and its operation was made necessary by the accumulations of ore at the mines.—Besides the 12,000 men who were left without work by the Compania Grande Mining Company at Pachuca, there will be others very soon, as it is announced that the Santa Gertrudis and the San Rafael mines will close up. Furthermore, it is rumored that salaries will be cut down by all companies in this city.

Jalisco.—W. R. Ramsdell of Guadalajara, president of the Casados Mining Company, and the Tenamache Mining Company and vice president of the El Favor Mining Company, has purchased a controlling interest in the Expectativa Mining Company of this city. This company owns the Expectativa

mines ten miles southwest of Ameca.—Several hundred mules are now being used by the Mexican Investment and Development Company in the transportation of copper concentrates from the Agua Blanca property in the Autlan district of this state to the Mexican Central station in Ameca. The Agua Blanca concentrating plant, which was recently remodeled, is now handling 100 tons of ore daily, and is producing from ten to twelve tons of concentrates. These concentrates have a value of from $90 to $100 a ton.

Mexico.—It is reported that all of the mines at El Oro are steadily shipping bullion, and the Dos Estrellas is engaged in shipping ore as well as bullion, while the Esperanzas is shipping bullion concentrates right along.

Oaxaca.—B. M. Hall, recognized as the best mining expert in Georgia, has been inspecting the holdings of the Georgia Mexiaco Mining Company and of the El Soccorro Mining Company in the Oaxaca district for the purpose of determining whether the properties will pay for the installation of mills for the treatment of their ores. He returned to the States highly pleased with conditions.—At the 100 foot level in El Soccorro in a new shaft sunk for the purpose of cutting the vein at the 200-foot level an entirely unknown shoot was encountered which will add immensely to the value of the property. This shoot was not even suspected to exist and the values found, running $25 United States money to the ton across a four foot vein, gives the Soccorro an additional body of good ore. The nearest known ore to the new find was about 400 feet away. —A. W. Cunningham, president of the American Mining and Smelting Company of Taviche, reports that although no shipments are being made from that camp extensive development work is under way for which purpose there is a scarcity of miners..

Pueblo.—The San Lucas Mining Company reports the practical completion of the new fifty-ton smelter which the company is erecting at its mine near Tehuacan in the state of Puebla. The smelter will be used entirely for the smelting of ores from the company's mines and no customs smelting will be handled.—Shipping ore was struck running from one-half to four kilos of silver and five to ten grams of gold. The ore is all self-fluxing and requires the addition of no foreign ore for matte. The tunnel which the company is driving at the present time taps the old workings of the mine five hundred feet below their level. The accumulation of ore will all be smelted when the plant is completed.

Sonora.—At the silver-gold mines of the Calumet and Sonora of the Cananea Mining Company two shifts are piling ore on the dumps for immediate shipment. Over forty miners are at work on the 100-foot Catalina shaft No. 2 where bonanza ore has been encountered and followed by a drift for fifty feet. Ore running $150 silver, $20 gold and 40 per cent. lead per ton is coming up the shaft at the rate of 20 tons per day.—It is stated that no more men will be let out at the Sierra de Cobre, the Copper Queen property in the Cananea district.—A great deal of prospecting is being done in the hills about Cananea and Magdalena.—A rich strike is reported on the Dorotha lately taken over by the Fay-Cananea company.—It is rumored that an American prospector has discovered some very rich gold placers near San Pedro del Distrito, this state. The American in question, it is said, has found nuggets weighing as much as 200 grams of pure gold, and will secure concessions and organize a company.

Tepic.—In the old Tenamache mines in the territory of Tepic, some distance north of the town of Santiago Ixcuintla, very rich ore has been encountered at the bottom of the old workings on the Platanitas vein. Samples from the hanging wall run 7,325 grams silver, and ten grams gold; from the foot wall 11,943 grams silver and four grams gold, and from the middle 32,850 grams silver and six grams gold. The respective values are $306, $482 and $1,322 a ton. The Tenamache mines are owned by the Tenamache Mining Company which was organized last July with a capital of $1,500,000, gold. A tunnel to cut the Tajo vein and drain the old workings is being driven by the Tenamache company. Later this tunnel will be continued to cut the Guadalupe and Buenos Aires veins. It is expected that development work during the next ninety days will warrant the erection of reduction works.

NEVADA

Churchill County.—At Camp Desert, adjacent to the Carson Sink and six miles from the Southern Pacific railroad, twenty-one distinct quartz ledges are being worked upon.—A sixty-foot shaft has been sunk on the Badger mine owned by Colonel Maxson of Reno and Walter Schmidt, the only pioneer that remains to the district being heavily interested, has a shaft sunk to a depth of 243 feet which encountered four distinct veins, one of which is a rich silver one, carrying native silver, and gold, tests of which ran to the $360 mark. The Desert King, another of his properties, has a high-grade ore of phenomenal values in gold, and one small cut produced $13,000. Also a tunnel and cross-cut have many tons exposed of the same ore coupled with two piles of high-grade awaiting shipment. Approximately $35,000 gross value of ore is exposed in this property.—Messrs Wilson and Boman have the group known as the Cinnebar Hill mine and are continuously following out a course of development attended with good results and expect to be in line for shipments the coming summer.—Colorado parties, amongst whom are C. Anderson, the well-known Aspen capitalist, and Brown, have an eight-claim group and intend opening up the various shoots next spring.—A new ledge rich in silver bearing galena has been discovered on the Pirocuette Wonder, making the third ledge on the property. On the strength of the outlook for the Pirouette, President Geiser will install a twenty-five horse-power hoist as soon as possible for deep sinking in the shaft, which in now down 103 feet. This shaft was started late in the summer on an eighteen-inch vein between perfect walls.—The vein on the Reliance Fairview, at Fairview, has been opened up for a distance of 2,800 feet, and the ledge has been tapped by surface and shallow shafts. A new strike running $71.40 in lead, copper and gold is reported.

Elko County.—The Tuscarora-Nevada Mines Corporation, which purchased the property of H. J. Mayham in Tuscarora, has plans which will be put in execution when $750,000 of the capital stock has been subscribed and which call for the sinking of a deep four-compartment shaft, the building of a mill to handle 1,000 tons of ore a day, the building of a large electrical power plant and the construction of a railroad from Elko to Tuscarora. Over one-half of the minimum working capital had been subscribed when the present financial conditions began, since which time no effort has been made to enlist support.

Esmeralda County.—The Elks Consolidated on the southern group adjoining the Wonder and Goldstone claims of the Goldfield claims of the Goldfield Consolidated, has been worked steadily throughout the strike, the company having an abundance of gold specie with which to pay the miners. An immense ledge of gold at the 500-foot level of the property assaying $14 a ton is of high importance to Goldfield as it indicates that the vast area south of the Florence and Atlanta has been hardly scratched.—The Original Rawhide Mining Company has been organized to operate a part of the Grutt lease in Rawhide for a period of eighteen months. A new hoist and supply

of lumber has been purchased in Goldfield with which the present eighteen foot shaft will be sunk to the 100-foot level.—W. E. Marsh and E. M. Henstis the original locaters in the promising copper district of Luning, have taken up nine claims on which they have sunk a twenty-foot shaft on a ledge sixty feet wide containing two feet of solid copper ore which assays from ten to twelve per cent copper, eight ounces silver and $2 in gold.—Work is being done on the Parrott property by McCormack and Dorsey, on the Mayflower by Posey, Holmes and Frank Knox; on the New York by H. B. Lund & Company, and on the Nevada Champion by Izzard and Fay.—Settlement has been effected between the Norcross Mining Company and several claimants to their ground, which is known as the Bulls and Bears, that will permit the company to proceed with development work on a broad scale. By the terms of the settlement, which was made by Detch & Carney for Bowen et al, the adverse claimants accept stock in the company for their interests.

Humboldt County.—The Eclipse Mining Company in the Seven Troughs district has struck a twenty-five foot ledge which averages $15 in gold in the breast of a tunnel which has been driven 125 feet. In the north drift, extended for thirty feet a streak has been encountered on the hanging wall running as high as $100 to the ton in gold.—With every round of shots, the recent rich finds on the Wild Cat and Little Hero claims of the Salt Lake-Navada Exploration Company, just north of the town of Farrell, in the northern end of the Seven Troughs district, improve in appearance. The shaft of the Wild Cat claim now has a depth of about fifty feet, and two shifts are employed. It will be sunk to a depth of eighty feet, and drifts will then be run on the ledge, which is about four feet in width and shows up exceptionally well. The tunnel which is being driven on the Little Hero claim has cut the ledge which was discovered on the surface.—The Golconda Consolidated, Ltd., incorporated under the laws of Great Britain, with a capital of $1,500,000, full paid up, and under the management of E. L. Labadie, will begin the erection of a large smelter in Golconda Canon just as soon as the weather will permit. Hans Loesch, metallurgist of the corporation, has arrived from Germany and will superintend the construction of the plant. The smelter will be built in units and the plant contemplated at the present time will be of 200 tons daily capacity. Units of 100 tons capacity will be added later. It has been decided by the corporation that what is known as the Salverberg process of smelting will be used.

Lander County.—On the property of Quigley and partner at Austin a tunnel has been driven 200 feet, 100 feet of which have followed a ledge averaging eight inches in width from which shipments have been made.—The Nevada Equity Mines Company were obliged to discontinue work upon their property on account of non-arrival of necessary timbers.—The leasers on the Jack Pot are now sacking ore with values running over $1,000 to the ton. The leasers on the Watt mine are through the break and again sacking ore, therefore it is safe to say shipments will again be made from this property.—Two more leases were closed on properties in Yankee Blade and preparations are being made to begin a vigorous campaign on properties in the north end.—The Wholey shaft has been cleaned out and more miners put to work upon ore bodies already blocked out.

Lincoln County.—The Nevada Mines Corporation, of Pioche, has received and installed its diamond drill with which it will determine the extent and richness of the ore bodies of the Baltimore claim. Progress will be watched with keen interest by all mining men of the locality.

Nye County.—The production of Tonopah for the week ending December 21st was 6,860 tons an at estimated value of $286,410.—The Tonopah Extension has purchased the machinery for a new mill which will treat the ores by a specially devised process.—Messrs Paul, Rule and Madigan have associated for the development of the Madigan lease at Round Mountain, and have already ordered a six-foot Huntington mill which will be installed and operating within three months.—That the Daisy Company of which Congressman Bartlett is president, will erect a mill is now an assured fact and it is probable that the owners of the Crescent and Solid Gold leases will also put up a mill, making three in all for the district.—Osborn and Williams are employing four men sacking ore from a ten-foot vein on their property southeast of Round Mountain. The ore on close chemical research proved to be a very rare mineral called alkinite, and the only other known locality in which this metal is found is in the Ural mountains of Russia. The mineral alkinite is a sulphide of copper, bismuth and lead carrying 740 ounces of silver to the ton.—Men were set to work recently on the Bullfrog View group of claims in the Lee district, owned by the Lee Mines Company.—The regular force of miners is now working in the tunnel at the California Bullfrog.—A report from the Mayflower states that an excellent quality of mill ore is being penetrated by the drift from the crosscut on the 400-foot level.—Shipments of sixty tons a day are being maintained at the Tecopa.—There are now forty men being employed at the Homestake excavating for the foundation, and the work is being hurried along as rapidly as possible to have everything in readiness to place the machinery as soon as it arrives.—W. M. McDonald, mill man at the Keane Wonder, pronounces the new plant a very great success.—Work has started on the El Benedido, situated just north of Rhyolite. The property is owned by Perry Lamona and William Cleary.

Storey County.—It is definitely decided to resume work in Consolidated Virginia, Union Consolidated Mexican and Savage early next month and instructions to that effect are daily expected from San Francisco headquarters. Resumption of operations on the Sutro tunnel level of Savage, Chollar and Potosi will begin at an early date and extraction of ore from the Yellow Jacket will follow the completion of the mill, which is about ready to go into commission.

Washoe County.—The new mill of the Renegade Mining Company at Olinghouse recently turned out a $600 bar of gold, the result of a thirty-six hour run on four tons of ore. In the Daily drift, where the vein has been exposed for a distance of about 300 feet, a winze has been sunk twelve feet and the volume and value of the ore increases with every foot of depth attained.

White Pine County.—On the Ingall's Eagle Pass mine in the Tule Canon district the leasers have eight inches of almost pure silver which is being sacked for shipment.—At the Gravity mine J. S. Purdy is installing a hoist which he purchased at Hida, and will soon be ready for work below the water.—The men are working on the Esmeralda, Exploration and Ole Elliott ground, with the old fashioned rocker.—Sam Cocroft working twenty days on a lease on the Nevada United mine near Ward, extracted a carload of ore running as high as fifty-six per cent lead with good values in silver, which he will hold pending a rise in the price in those metals.—Assessment work in the White Pine district has been done by nearly every one of the persons owning mining property, for the year 1907, if mining men supposed to be strictly conversant with local conditions are to be taken at their word.

NEW MEXICO

Grant County.—A cyanide mill of 1,000 tons daily capacity is contemplated in the Steeple Rock district where smelting returns show values ranging from $100 to $2,000 a ton. The most prominent mines of the neighborhood are the Laura, Jim Crow, Imperial, Alabama, Furnace, Gold Spike, New Year's Gift, Geronimo, Summit, Bellall, Nugget, Davenport, McDonald, Modderfontein, Wernher, Belt, East Carlisle, Gold King, Big Four, Pay Car and Link; the Delamar, and Delamar No. 1, 2, 3, which yield in addition to gold and silver a high percentage in copper.—The interest of F. H. Perry in the Laura lease has been purchased by H. C. E. Spence, who has perfected arrangements to work it in connection with the Twin Peaks Mining and Milling Company. It is estimated that there are upwards of 60,000 tons of ore developed in the Laura mine, besides about 2,000 tons on the dump. A contract has been let to crosscut the parallel vein of the Laura. The surveyed distance is thirty feet, and in addition to this a contract has been let to sink the main shaft 100 feet deeper.

The Santa Rita Copper Company has produced 5,000,000 pounds of copper during the present year.—The Tulloch Copper Mining Company expect to begin operations after the first of the year and develop a group of eleven very promising copper claims in the White Signal district.

The Copper Gulf Development Company will increase its holdings from eighteen claims to over sixty claims and will acquire an acreage of approximately 1,000 in the very heart of the rich porphyry copper belt of the Burro mountain district. The properties included in the deal are twenty-eight claims of the Alessandro Copper Company, called the Gettysburg group, seventeen claims in the Bentley group, and with the eighteen claims of the present Copper Gulf holdings, will form nearly 1,000 acres in the copper porphyry belt of the district. It is understood that as soon as the deal is completed extensive development work will begin at once by the Copper Gulf Company. Machinery will be installed for going down to a great depth.

Socorro County.—Preliminary surveys have just been completed by H. Bugbee, civil and hydraulic engineer, at the instance of E. G. McDermitt, superintendent of the Treasure Valley Mining Company, formerly the Helen Mining Company, owners of the famous Confidence group of mines, to establish a line and grade to take the waters from Whitewater creek across the mountain to the Confidence mine. A new cyanide mill will be erected at or near the portal of the Confidence mine and will treat the large tonnage of ores blocked out in the reserves and thus save the heavy expense of transportation which has been heretofore a serious drawback.

SOUTH DAKOTA

Custer County.—Capt. John Dona Idson, of Minnesota, is on his property north of the Custer Peak Company's mines and is making arrangements for extensive developments during the coming year.—H. Walter is planning to operate on a large scale on the Octoroon ground which has been opened up with a number of shafts and tunnels.—The Sherman brothers are also getting ready to thoroughly open up the Ama Queen ground, which has at the surface a three-foot ledge of $25 free milling ore. The shaft is down ninety feet and they have started a crosscut towards a quartzite dyke to tap the ledge which faulted at the thirty-five-foot level.

Lawrence County.—The transfer of operations from the Imperial mill to the Dakota plant of the Imperial company brings thirty stamps into action which turn out eighty tons a day and will in a few weeks be treating 120 tons a day.—As soon as the new machinery and power drills are in operation at the Homestake South Extension, the present force of miners will be materially increased. About 1,500 feet of drifting work in several directions have been accomplished in the mine.—Most of the mills of Lawrence county have completed their semi-monthly clean-ups and have in every instance reported most satisfactory results. Several of them have broken records and have turned out more gold than in any similar period in their histories.

Pennington County.—The Mariposa Mining Company after two years' patient search has encountered the ledge 500 feet below the apex of the vein. It has been penetrated for a distance of four feet and the hanging wall has not yet been reached. Most of the gold is in the free state and will average about $15 to $25 to the ton.

Imagine the magnitude of the diamond trade in the United States when for seven months this year the total value of the cut stones imported was $13,676,406; of uncut stones, $6,485,815; and of diamond dust or bort, $148,937. But the populace is apparently not as extravagant this year as it was last, for the imports of cut diamonds have fallen off $1,387,879, perhaps because the gem is more expensive.

Notes From the Trail

By E. A. Hayes, Los Angeles representative Mines & Mining:

The Prospectors' Supply Company of Los Angeles, is doing a land office business. The man at the helm, Mr. Pritchard, says that it pays to advertise and that his ad in this paper is bringing results. His assay outfit is being called for all over the country. It is a wonderful help to prospectors, as without experience they can make their own assays in the field for less than five cents an assay, and make them right.

In the windows of D. G. Doubleday, a Los Angeles mining broker in the Alexandria hotel block, is exhibited a rare display of gold ore from the Crown Point, Johnnie, Nevada. It is in the shape of quartz, but there is more gold in it than quartz. Some of it runs more than $500,000 a ton and it is said to be the finest display of gold ore ever made and attracts a great deal of attention.

Wm. H. Dowling has made what may be a big strike of copper ore in the western part of Pima county, Arizona, south from Gila Bend on the S. P. railroad. The find is in the Gobbler mountains. In a prospect hole only ten feet deep, the showings indicate a rich mineral deposit

The La Dura mine, so called, consisting of the La Dura, La Gloria, and La Prietta, in the Sahuaripa district, of Sonora, Mexico, is making a big showing. The silver runs from 300 to 500 ounces per ton, and the copper about 6 per cent. German crushers are used and 800 men are employed most of the time. When the new railroad is completed it will add largely to the shipping facilities of the district.

The American Tin Mining Company has recently been incorporated and hung its banner on the outer walls. The concern has eleven claims in the San Gabriel River Canyon. The ledge is 150 feet wide and carries about $12.50 in values of tin platinum and gold. Frank N. Shaw is president, O. E. Smith, secretary, and A. C. Kellogg, treasurer.

The Starrett pump people (the W. G Leale Co.) are rustling these days. A representative of the company will go to Vancouver, Canada, to start operations there in the near future. Mr. John D. Smithers of the concern, goes to England within the next sixty days to exploit the pump on the continent, and will take along a full sized pump as an exhibit. The Mining Journal of London, England, has called on the company for particulars and in the near future will print for its English

readers, a description of Mr. Starrett's famous invention.

A mountain of marble has been discovered twenty-two miles northeast of Redlands in San Barnardino county, California. The ledge is 2,980 feet high and of solid marble. Much of it looks like the famous Nubian article. It is of all colors, black, white, blood red, gray, yellow, mottled, etc. The discovery was made by George Burris and his town sons, Arthur and Oscar. It is in an almost inaccessible place and hitherto has been overlooked. The discovery reads like a romance. The discovery is attracting considerable attention. A company has been formed with Mr. Burris as president and active work begun.

Mr. Burris and his two sons were prospecting for gold and found marble float in a canyon. They traced it for days and after great hardship and numerous perils, located the marble mountain. In places they had to let themselves down over precipitous cliffs with ropes. At one time, while resting under the brow of a precipice, a monster boulder became detached and bounded over the place, down into the canyon below. The discovery was actually made by Arthur Burris, a young man under twenty years of age. A fortune is in sight for Burris and his boys.

Robert W. Smith, an elevator boy in a Los Angeles hotel, has a fair show to become a millionaire. At the present time he, with a partner named John Walsh, own a group of six claims in the Willow creek mining district, near Gold Valley in Inyo county, California. Young Smith's claims adjoin the Ramsey property reported in Mines and Mining of December 20th last when the ore run $1,000 per ton. Several other big strikes have been made in the same vicinity, viz: in the Royal Blues running high in silver and copper; the Baldy, a shipping proposition of silver, copper and lead; the Nevada Greenwater with an average of 36 per cent. in copper. There are also properties in the same section that show big values. Smith's claims are in the center of them all, and while very little work has been done on the young man's outfit the surface ore assays well up to $100 in gold. The boy is in the center of a rich country. He is level-headed as a meat ax, and isn't afraid of the commodity called "work," which, by the way, is dreaded by many young men of this day and age.

Mr. H. P. Jansen, a very quiet gentleman, yet one of the most expert mining men in the West, has been spending a few weeks in Los Angeles. Mr. Jansen recently sold his large tungsten interests in the Randsburg district and came out over the trail weighted down with gold, but he deserves it all and more, too. His word and judgment never go amiss.

Mr. F. A. Wiswell of Los Angeles, a very accomplished and experienced mining engineer, has completed the details of a new concentrator and pulverizer, and before long will have his system of machines at work in this city, and from what the experts say they promise to be a pronounced success. He has a strong company of clean men behind him who have the energy to back in a business way, the products of his marvelous intellect.

The Whipple Mining Company has one shaft down about fifty feet and are running into high-grade sulphide copper ore. The assays from the lowest point show an average of 17 per cent. copper and $14 gold. Mr. Brice, the president of the concern, left Los Angeles for the mine January 1st. Brice is a first-class miner and says that he intends to have one of the best "shaped up" mines in the country, "and" he further said, "we have got the ore to back it."

The Los Angeles Chamber of Mines is getting ready for its annual election which will take place January 22, 1908. A committee to nominate officers has been named consisting of Mr. J. M. Schneider, president of the Merchant's and Manufacturer's Association; Mr. O. M. Souden, vice president, United States National bank; Mr. M. J. Monnette, president Nevada Stock Exchange, and Mr. Fielding J. Stilson, general mining broker. This committee will select the names of the officers and directors to be balloted for viz: A president, two vice presidents and seventeen directors. There are fourteen permanent committees and one of the to be elected directors heads a committee as chairman. As there are seventeen directors and only fourteen committees three of the directors are without a chairmanship job. Following is a list of the committees: Building and Permanent Exhibit, Commercial and Mercantile Affairs, Entertainment, Expositions, Finance and Auditing, Grievances, Hotels, Investigations and Reports of Mining Properties, Laws, Publications and Statistics, Manufacturing, Membership, Mines and Mining, Petroleum Products, Transportation. The secretary of the chamber is appointed by the directors and undoubtedly, Mr. Arndt, the present genial and efficient incumbent, will be retained. The Chamber of Mines is doing a good work.

The coinage of the United States mints in August was as follows: Double eagles, $23,384,540; half eagles, $1,010,000; total gold, $24,394,540. Quarter dollars, $125,000; dimes, $558,000; total silver, $683,000. One-cent bronze, $165,000. Total coinage, $25,242,540. In addition there was coined for the Philippines 846,000 pesos.

Personal

C. A. Pringle of Chihuahua, Mexico, is in Denver.

Wm. Lennox of Colorado Springs, Colorado, is in Denver on a business trip.

Etienne A. Ritter of Colorado Springs, made a trip to Denver during the holidays.

Louis Brunel, E. M., of Tonopah, Nevada, is spending the holidays with his parents in Denver, Colorado.

Charles Hocking has accepted the superintendency of the mill of the Democrat Mining Company, Georgetown, Colorado.

Obituary

Capt. A. Paddock of Boulder, aged eighty-three years, and father of L. D. Paddock, editor of the Boulder Camera, died in that city on the 23d ult. of pneumonia. Captain Paddock was a pioneer of Boulder and had been engaged in mining for a quarter of a century.

Noah Bristol, a prominent pioneer of Laramie county, died at St. Cloud, that county, last month, at the age of seventy-one years. He was born in Vermont in 1836 and came to Larimer county in 1874, settling on Box Elder creek, eighteen miles north of Fort Collins, where for years he successfully engaged in raising sheep, ranching and dairying. One son and two daughters survive him.

After an illness of ten days Dr. John Boise died in this city last week of la grippe, at the age of sixty-eight years. He was a distinguished physician and surgeon and had an extensive acquaintance throughout the state and other states. Eighteen years ago he came from Detroit, Michigan, and settled in Denver. He became associated with the Gross Medical College and was connected with that institution until the last few years of his life, when his advancing age and extensive practice made it necessary for him to give up the work. He was prominent in lodge work, being a shriner and a member of Masonic Lodge No. 5. Dr. Boise is survived by the widow and one brother, who reside in New York City.

Last week, Thursday, Patrick Britt of Englewood died after a lingering illness of several months. He came to Colorado over twenty years ago and engaged in mining. Mr. Britt was a Cripple Creek pioneer and located and developed some of the noted mines of that district, among them the Silver Tip, Molly McGuire, Hannah Britt and others. From these mines he made a big fortune, but money easily made is often as easily spent, and much of his

money went in prospecting and looking for something better. He was also prominent in Boulder, where he at one time had large holdings in oil wells. Many of the West's most prominent men were his associates in the mining business.

Surviving him are the widow and two married sisters, all in Denver. Mr. Britt was born in Titusville, Pennsylvania, and was a member of the Odd Fellows of this city.

Herbert A. D. Lowe, who died last month at Kern, California, at the age of thirty-two years, was a graduate of the West Denver High School, the School of Mines at Golden, had been a soldier in the Philippines, and was a member of the Sons of the American Revolution, Brotherhood of American Trainmen, a member of Camp J. S. Stewart, Army of the Philippines, and served with distinction in Company I, Colorado Volunteer Infantry in the Philippines. He was a brilliant young man, very popular, and had he lived a few years longer would have reached a high position in his occupation with the Southern Pacific railroad, where he was employed at the time of his death, which was due to typhoid pneumonia. His remains were returned to Denver and laid at rest in Fairmount under the auspices of Camp J. S. Stewart. He is survived by the widow and father and mother, Mr. and Mrs. Barton Lowe of this city.

Frank C. Kendrick, a well known mining engineer of Colorado, died quite suddenly at a hotel in Greenville, Pennsylvania, where he had gone to attend a directors' meeting of one of the companies in which he was interested. Death was said to be due to a blood clot on the brain. He had lived in Denver for over thirty years and his business as a mining engineer extended over a wide part of this Rocky mountain country. At the time of his death he was chief engineer of the Verde Water & Power Company of Arizona, and was engaged in the construction of a dam over 200 feet in height on the Verde river, about the same distance from Phoenix as the Roosevelt dam, and nearly the same size, to irrigate 200,000 acres of orange and semi-tropical fruit lands and for furnishing large horse power, at an expenditure of about $10,000,000. A. C. Sheldon, president of the Verde Water & Power Company, dropped dead some two months ago in a manner similar to Mr. Kendrick, and operations on the great dam have been temporarily suspended. Mr. Kendrick has two sons, Elmer, at the Agricultural College, Fort Collins; and France C., who recently returned from a railway engineering trip in Mexico and Central America. F. C. Kendrick was born in Randolph, Ohio, October 11, 1852, and was educated at Randolph and Kent, and is a graduate of the high school, afterward studying engineering. He took up the practical work of surveying. As a young man he was assistant to Thomas Withers, chief engineer in the construction of the Denver & South Park railroad through the Platte canon to Bailey, at that time considered an engineering feat of no mean moment. He constructed the Mesa canals in Carbon county, Wyoming, where for the first time was demonstrated by him the utility of using a sheet steel pipe as a substitute for flumes in carrying water across gulches and depressions. His system has proven of vast benefit and has since been used extensively throughout the West. In 1889 Mr. Kendrick took charge of the first party engaged to survey the Colorado-Pacific railroad from the Grand and Colorado rivers, and was the first surveying party which ever attempted to do this work, in which they had many thrilling experiences; the party succeeding them losing several of its members by drowning. He has been consulting or chief engineer for the construction of many hundreds of miles of large irrigating canals throughout Colorado, Arizona, Utah, Idaho, Wyoming and Nebraska, which has brought under cultivation many hundreds of thousands of acres of now fertile grounds. He was also chief engineer for some large mining properties, among them the San Juan Smelting & Refining Company, of which he was general manager. He built the Kendrick & Gelder smelter at Silverton, and opened the Henrietta mine to its present large proportions. Besides his wife and sons, he leaves four brothers and one sister, viz.: W. F. Kendrick, president of the Kendrick Promotion Company; M. G. Kendrick, "Kendrick Farms," west of Littleton; Charles A. Kendrick, president of the Kendrick Book & Stationery Company; Dr. James G. Kendrick, a prominent dentist at Los Angeles, and Mrs. Clara K. Barnett of 103 South Corona street, who is spending the present winter in Los Angeles.

A material for which not much use has yet been found is the wax of Myrica cordifolia, a shrub originally planted in Cape Colony to bind drift sands. The Cape berry, as the fruit is known, is about as large as a pea and three bushels produce ten to fourteen pounds of wax, which is now valued in London at $275 per ton. The wax seems to be adapted for making soap, and possibly for candles.

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CARBORUNDUM MOLDS FOR CASTING ALUMINUM.

According to the Brass World (Aug., 1907), one of the recent uses for carborundum is in molds for casting aluminum. W. A. McAdams, who has taken out many patents upon the casting and working of aluminum, has now patented the use of carborundum for molds.

He appreciates the fact that aluminum, or any other metal for that matter, is rendered more dense when cast in a metal mold which conducts the heat away from the molten metal rapidly. Sand molds conduct the heat slowly and the castings made in them are coarsely crystalline. The inventor claims that carborundum conducts the heat away from the metal rapidly and gives a dense casting.

For the mold he uses a mixture of carborundum, finely powdered, and mixes it with sugar and a small quantity of clay. The following proportions are used: Carborundum, ten pounds; sugar, twelve ounces; clay, ten ounces. The whole is mixed together with enough water to render the mass plastic, and then formed into molds. These molds are then baked.

Mr. J. M. Boutwell of the United States Geological Survey will visit the Coeur d'Alene (Idaho) district this year to study the character, occurrence and genesis of the lead and zinc ores of the district. A special study will also be made of reduction plants and methods.

MACHINERY AND EQUIPMENT

Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.

SINGLE PHASE MOTORS.

The field for the use of single-phase motors of moderate capacity is constantly growing by reason of the increasing tendency of central stations to generate polyphase current and feed a large portion of the load through single-phase distribution.

Power is frequently required near such circuits for the operation of light machinery, and it is most conveniently furnished by the installation of the General Electric Company's type IS, form KG, single-phase motors.

The KG motors are in appearance similar to those of polyphase design. Sizes ¼ to 5 H. P. inclusive are built in a unique form of construction known as the riveted frame, in which the laminations of the stator core are riveted together between cast iron flanges to which the end heads are secured, thus exposing the core directly to the air. The cast iron shell or box frame employed in less advanced designs is entirely omitted.

This new form of construction possesses several important advantages, such as improved ventilation, reduced weight and extreme compactness. These desirable features are attained without sacrificing quality in any respect, or lowering the high standard which the General Electric Company maintains at all times in apparatus of its manufacture.

The bearing brackets are removable and can be shifted 90 to 180 degrees, for the purpose of wall or ceiling suspension, respectively.

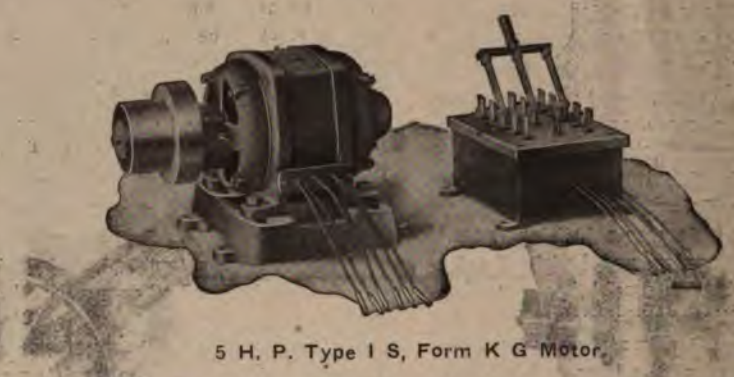
Internal automatic devices for starting are eliminated, thus producing a motor of simplest mechanical construction.

Motors ranging from 1 H. P. to 5 H. P., inclusive, are fitted with six terminals, while the remaining motors have three terminals.

The ¼ and ½ H. P. motors have slotted feet for the purpose of tightening the belt. With the larger motors iron sliding bases are provided for this purpose, although motors can be supplied without bases, if so desired. All bases are designed for supporting motors when installed on floor, side wall or ceiling.

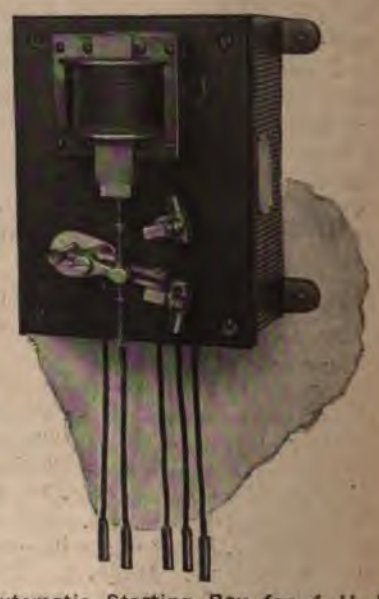
Clutch pulleys are furnished with motors of 1 H. P. and larger. By the use of these clutches the starting current on the six-lead motors will not be greater than 200 per cent. of full-load current when starting the motor under full load, while the three-lead motors require three to four times full-load current when starting under full-load. The clutch pulley consists of an outer shell which is free upon the shaft and a friction band attached to the shaft, and which always revolves with it.

The motor is rendered self-starting by means of a starting box containing resistance and reactance, and a double-throw switch for the 1 H. P. motor and larger. The switch is first thrown to the starting position, and when the rotor has attained almost full speed is quickly thrown over to the running position, the object being first to connect the resistance and reactance in circuit with the motor and then to disconnect it.



5 H. P. Type I S, Form K G Motor.

When the conditions of operation are such as to require the motor to start and stop automatically, as in connection with float switches governing pumps, refrigerating apparatus, etc., this company can supply an automatic starter.



Automatic Starting Box for 1 H. P. Motor.

This device is both simple and reliable. Excepting for the ¼ and ½ H. P. motors the automatic starter may be substituted at any time for use with

A—Clutch Body, B—Friction Band, C—Adjusting Spring, D—Outer Clutch Shell of Pulley Sleeve E—Solid Removable Pulley.

F—Internal Mechanism Comprising Parts A, B and C, G—Outter Shell and Pulley Comprising Parts D and E.

Parts of a Centrifugal Clutch Pulley.

motors already installed in place of the non-automatic box ordinarily furnished.

When operated continuously at full load, on circuits of the correct voltage and frequency, the temperature rise will not exceed 40 degrees C. A con-

Wall Instalation.

tinuous load of twenty-five per cent. for two hours or a momentary overload of fifty per cent can be carried without excessive heating.

Single-phase motors are well adapted to the operation of all kinds of machinery by means of belts and gears, or to direct connection to loads requiring only moderate starting torque, as in the case of generators, blowers, etc., to which they may be direct connected with rigid couplings. Where greater torque is required at the moment of starting, as in the case of pumps under head, clutch couplings should be used. When the gearing is to be employed, the ordinary pulley can be removed from the clutch sleeve and a pinion substituted; this is preferably made of rawhide in order to reduce the noise.

The low weight per horse power obtained by the riveted form of construction employed permits of special application heretofore not available. When necessary, modifications in standard construction may be obtained to more readily adapt motors to special applications.

WM. AINSWORTH & SONS.

Wm. Ainsworth & Sons, whose balances and engineering instruments are widely known for their accuracy and precision, was established in 1880. In the earlier part of their business the principal product of their factory was the Ainsworth balance, but within the last four years they have been extending their manufactures and are now putting out high-grade engineering instruments. These surveying instruments are made only of the hardest bronze, gun metal, and bell metal alloys, and are built to standard limit gauges and strictly interchangeable. In all, the Ainsworth make five types of transits, adapted to the different phases of surveying work. One of these, the Mountain and Mining Transit with interchangeable top and side telescope, is very light and compact, which is an estimable feature from a mining engineer's point of view, as it is arduous work packing transits up and down and around in mine workings. Besides these regular tripod transits, the Ainsworth company are sole manufacturers of the Brunton Pocket Tran-

Ainsworth Mountain Transit.

sit, which is now largely used throughout the mining engineering profession. This instrument is especially adapted to preliminary surveys, (both underground and on the surface), to geological field work, taking of topography, or for any purpose where a moderate degree of accuracy will suffice.

The Ainsworth balances have been largely used in mining practice for over twenty-five years, and the merits of these balances are proven by the satisfaction they have given. In all, nine types are made, two of which are portable balances, and two analytical balances. Of the two portable types, one is a button balance, and the other a pulp balance. A late patent of this company is an improved multiple rider carrier, which lessens the handling of the riders, and saves the time and annoyance of such handling. Agencies for the Ainsworth supplies are located in every mining center of the United States as well as branch agencies in Mexico, Canada, England, Australia, South Africa, Philippines, India and Japan.

A novel institution of Tarare, France, is a mycological laboratory, where expert judgment is pronounced upon mushrooms. The fungi are abundant in the locality, and the examiners have found that excellent edible qualities are possessed by an astonishing number of varieties that had been avoided as dangerous.

In the efforts of the Belgian State Agricultural institution to improve farm plants, manganese salts have given such surprising and remarkable results as a manure for potatoes that this crop seems to have been made very profitable. The effect of manganese on beets, however, proved quite different.

Phototrophy, or change of color in light and restoration to original color in darkness, has been found by Marckwaldt in a very few substances. Of possible value in photography, the discovery is especially interesting as representing a possible direct conversion of light waves into chemical energy.

Portland Cement Making

Portland cement is an artificially prepared compound which has the property of hardening in air or water when mixed with a proper proportion of water, and of remaining hard even when immersed in water. Its strength increases with age, a well-known American brand showing a tensile strength per square inch for neat cement briquettes of 563 pounds after twenty-four hours, 626 pounds after seven days and 776 pounds after twenty-eight days.

True Portland cement, to be of a uniform reliable quality, can only be made from an artificial mixture of the raw materials. Nature provides these in the form of limestone, chalk or marl for one ingredient and clay or shale for the other. An intimate mechanical mixture is made containing in a very finely pulverized state suitable proportions of some one member of the first group, with one member of the second, and the compound obtained is calcined or burned to incipient vitrification. The resulting clinker when pulverized to a fine powder becomes Portland cement of commerce.

Portland cement is made by what are known, respectively, as the dry and wet processes. The physical properties of the raw materials to be used are a large factor to be considered in determining which shall be employed.

The dry process is mostly used where limestone is mixed with clay or shale and where argillaceous limestones such as exist in the Lehigh valley and at the foothills or hogbacks of the Rocky Mountains are used as raw material. Recently this process has also been used where drained marl beds form the source of the supply of raw material. In the dry process the materials forming the raw compound are thoroughly dried, then mixed and ground to a very fine powder; the finer the better the resulting cement and the smaller the amount of fuel required to calcine, the final fine grinding being nearly always done in a tube mill. This acts at the same time as an excellent mixer. The fine powder, sometimes slightly dampened to allay dust, is fed to the kiln and calcined to incipient vitrification.

The wet process is most applicable where marl and clay are used, although it is sometimes employed where limestone or chalk and clay or shale form the raw materials. In this process the raw material, with the addition of from forty to sixty per cent of water, is worked into a slurry. This slurry is then pumped into rotary kilns and being exposed to a clinkering heat, becomes Portland cement clinker.

Rotary kilns are now used almost without exception in America for burning the raw materials. This type of kiln consists of an inclined steel cylinder, six feet to eight feet in diameter by sixty to one hundred and fifty feet long, lined with refractory material. The tendency with practical cement engineers is toward kilns 125 feet and over in length. The kiln is provided with a driving mechanism which gives to it a speed of about one revolution per minute. At its lower or front end is located the firing hood, through which powdered coal, oil or gas is injected into the kiln and burned. Local prices determine the relative economy between oil and powdered coal, although the latter is now most generally used. Natural gas is also being used to advantage, notably in Kansas.

When powdered coal is used, the coal is first crushed to pea size, then thoroughly dried, and the pulverization completed in tube mills to a fineness which allows at least ninety per cent to pass a 100-mesh screen. The fineness to which the coal is ground affords largely the amount required to burn a barrel of cement; the finer, the better. This pulverized coal is stored in hoppers containing from twelve to fifteen hours' supply. It is drawn from the hoppers by an adjustable feed conveyor and injected into the kiln by an air blast and then ignited. When petroleum is used, it is generally vaporized and burned in the kiln with the assistance of a steam jet.

In the dry process using 125-foot kilns and longer, approximately 100 pounds of coal, twelve gallons of oil or 2,000 cubic feet of gas are required to burn a barrel of cement.

The rotary kiln is continuous in its operation. The raw compound, being fed in at the upper end in the form of slurry for the wet process, or as finely pulverized dry powder in the dry process, is first relieved of all its moisture, then its carbonic acid is expelled, and finally it issues from the lower end of the kiln, at white heat, in the form of little balls or pellets, which vary from the size of walnuts to that of large peas. This is called clinker.

The clinker is, after cooling, ground so that ninety-two to ninety-five per cent of it passes a 100-mesh laboratory screen. Ball and tube mills are mostly employed for this work, the former for the preliminary grinding and the latter as a finishing pulverizer. The product from the finishing tube mills is conveyed and elevated into storage bins, where it is allowed to age. It is then packed for the market in barrels (of 380 pounds net) or sacks, (four sacks of ninety-five pounds each to a barrel,) as preferred. About two per cent of gypsum is added to the clinker, and one per cent of ground plaster to the ground cement to regulate the rate of setting.

Allis-Chalmers Company is the largest manufacturer in the world of cement making machinery. During the year 1903, when the total production of Portland Cement in the United States was a little more than 20,000,000 barrels, Allis-Chalmers Company sold cement making machinery capable in the aggregate of turning out 5,000,000 barrels of finished cement per annum, and it has since kept pace with the remarkable development of that industry, as described by numerous articles recently appearing in the trade and technical press.

SIZINGS

The Wilfley table has been in use about ten years.

The total production of refined lead, including both desilverized and soft lead, for 1906, was 404,699 tons.

One of the newest types of steel head frames is that at Butte, Montana, on the New Leonard shaft.

In Mexico, the laws class mines as real estate and shares in mining companies as personal property.

Ordinary quartz in place averages one ton to thirteen cubic feet, but when broken to a shoveling size, it occupies about twenty cubic feet.

Hoisting ropes should have a factor of safety of at least seven times the maximum load. In some districts the legal requirement is a factor of ten.

Many small head frames use heavier timbers than are necessary, but it isn't safe to put in light ones unless you have figured out your stress diagram.

Cement patching in one of the most useful innovations possible. It has saved the shutdown of more than one plant, when it would have been most inconvenient.

Most crushers are fitted with an idler pulley, so that in case the throat becomes choked, the movement of the jaws can be stopped by throwing the belt off the fixed pulley.

Exposure to radium for thirty days in Professor Bordas' experiments seems to have changed light red corundum to ruby red, violet to sapphire blue, and blue to emerald green, while white became topaz yellow. An expert pronounced the changed specimens genuine precious stones, the ruby of large value, and the ruby and sapphire appear to differ in no respect from the natural gems.

THE STOCK AND METAL MARKETS

Colorado Springs

Jan. 2.—Following were the closing quotations on the exchange today:

Mines.

Stocks.	Bid.
Acacia	06
C. C. Cons.	03⅛
C. K. & N.	05½
Dante	05½
Dr.-Jack Pot	05¾
Elkton	47⅞
El Paso	25
Fanny Rawlins	05
Findley Cons.	38
Gold Sovereign	03½
Gold Dollar	06
Index	02
Isabella	24½
Jack Pot	04
Last Dollar	01½
Lexington	01½
Mary Cashen	....
M. McKinney	30
Mollie Gibson	....
Moon-Anchor	01½
Old Gold	02⅞
Pharmacist	02⅝
Portland	97½
Prince Albert	0075
Vindicator	74
Work	13⅝

Unlisted.

Stocks.	Bid.
Golden Cycle	40
Jennie Sample	....
Jerry Johnson	05⅝
United Gold Mines	04⅞

Prospects.

Stocks.	Bid.
Anchor	....
Aola	007
Banner	01¼
Buckhorn	0075
C. C. & M.	008
Des Moines	007
Gould	....
Hart	....
Ida May	01¼
Jolly Jane	0075
Keystone	....
Little Bessie	....
Little Nell	01
Little Puck	01
Mary Nevin	01½
Mountain Beauty	05
Missouri	005
National	008
New Haven	005
Pilgrim Cons.	01
Princess	0045
Requa Savage	02¼
Robert Burns	....
Rose Nicol	....
St. Thomas	01
Teutonic	01¾

Miscellaneous.

Stocks.	Bid.
C. Gold Camp	....
Flower of West	0055
Kitty	0025
Mariposa	003
O. K.	004
Uncle Sam	002

New York

Jan. 2.—The spectacular decline in copper in the last few months has brought out some very interesting statistics. At the beginning of the year prices were as high as 26, at the close as low as 13½ cents. Following are the market values for lake copper during the 12 months of 1907:

	High	Low
January	26	24¼
February	26⅛	25¼
March	26⅛	25½
April	26	25½
May	26	25½
June	26	25
July	26	22
August	22⅛	18
September	18⅛	15
October	15	11¾
November	15	13¼
December	14	13½

All stocks show steady gains this week over our report of a week ago, which is a certain indication of better things. We note a steady rise in the past four weeks, each week of a few points, which is the best barometer of returning normal conditions. Amalgamated Copper, American Smelting, Colorado Fuel and Iron, etc., are all on the upward move.

Following are the closing quotations:

Stocks.	Close.
Amalgamated Copper	48⅛
American Smelting	72¾
do pfd	92¼
Colo. Fuel & Iron	19⅞
Anaconda Copper	29¼
Republic Steel	66
U. S. Steel	26¾
do. pfd.	89
General Electric	113
Utah Copper	21
National Lead	39¼

Curb Quotations.

*Stocks.	Bid.
Arizona Commercial	15
Ahmeek	50
Black Mtn.	4¼
Cumberland Ely	6⅜
Davis-Daly	3⅞
Ely Cons. Copper	⅜
East Butte	4⅜
Furnace Creek	....
Giroux	2½
Greene Cananea Copper	7
Globe Cons. Copper	6¾
Hancock	4⅞
King Edward	¾
Keweenaw	4¾
Mitchell	....
Nevada Utah	3
Nevada Cons.	8¼
Nipissing	6½
Superior & Pittsburg	10⅜
Tintic	3
Utah Apex	2⅝
Carisa	20
Dom. Copper	1¾
Montgomery-Shoshone	4½
B. & L.	¾
Ely Giroux	1

*Otis & Hough.

Boston

Jan. 2.—Calumet & Hecla completed the most prosperous year in its history. The company has produced and sold during the past 12 months 90,000,000 pounds of copper, at an average of 20 cents. Following are the quotations:

*Stocks.	Bid
Adventure	2⅝
Arcadian	4¼
Allouez	28¼
Atlantic	9
Bingham	4½
Boston Cons.	10⅞
Balaklala	1⅞
Butte Coalition	15⅝
Calumet & Hecla	595
Calumet & Arizona	102
Centennial	24½
Copper Range	57½
Daly-West	7
Franklin	7¾
Granby	75½
Isle Royale	17⅞
La Salle	13¼
Mass.	3½
Michigan	9
Mohawk	47
North Butte	43½
Old Dominion	29
Osceola	86
Parrot	10
Quincy	81
Shannon	10
Trinity	14½
U. S. Smelting	33¾
do. pfd	38½
Utah Cons.	30
Victoria	4¾
Winona	4⅞
Wyandot	60
Wolverine	45

*Otis & Hough.

Nevada

(Furnished over the private wire of O. L. Malo & Co., 221-223 Boston Building, Denver, Colo.)

San Francisco, Cal., Jan. 2.—Following were the closing quotations on mining stocks today:

Comstock.

Stocks.	Bid.
Ophir	1.15
Mexican	32
Cons. Virginia	55
Savage	36
Hale & Norcross	40
Belcher	....
Sierra Nevada	36
Exchequer	20
Union	26

Tonopah.

Stocks.	Bid.
Tonopah of Nevada	4.00
Montana Tonopah	1.87½
Tonopah Extension	....
MacNamara	18
Midway	50
Tonopah Belmont	65
Tonopah North Star	09
West End Cons.	32
Rescue	04
Tonopah & California	02
Golden Anchor	02
Jim Butler	41
Cash Boy	....
Monarch Pittsburg Ext.	01
Golden Crown	....

Goldfield.

Stocks.	Bid.
Sandstorm	21
Mohawk	11.00
Columbia Mountain	....
Jumbo Extension	56
Vernal	05
Pennsylvania	....
Kendall	....
Booth	17
Blue Bull	17
Adams	05
Silver Pick	28
Nevada Boy	02
Black Butte Ext.	03
Blue Bell	08
Dixie	04
Goldfield Columbia	08
Hibernia	03
St. Ives	43
Conqueror	04
Black Rock	02
Lone Star	09
Goldfield Wonder	....
Oro	09
Kendall Extension	....
Sandstorm Extension	03
Mayne	02
Atlanta	29
Great Bend	25
Simmerone	03
Empire	04
Red Top Extension	12
Florence	3.87½
Diamond B. B. Cons.	17
Goldfield Daisy	90
Combination Fraction	68
Great Bend Extension	05
Great Bend Annex	03
Black Butte Bonanza	02
Kewanos	....
Esmeralda	01
Portland	07
Crackerjack	08
Francis Mohawk	35
Red Hills	32
Mohawk Extension	....
Lou Dillon	05
Yellow Tiger	12
Grandma	05
Silver Pick Extension	....
Yellow Rose	....
Columbia Mountain Extension	....
Diamondfield Triangle	07
Coming Nation	03

Bullfrog.

Stocks.	Bid.
Original	....
Bullfrog Mining	05
Montana Bullfrog	01
National Bank	09
Lige Harris	....
Amethyst	06
Gold Bar	38
Denver Bullfrog Annex	03
Mayflower Cons	16
Montgomery-Shoshone Extension	02
Golden Scepter	02
Bullfrog Diamondfield	03
Homestake Cons	70
Yankee Girl	01
Nugget	03
Tramp Cons	....

Manhattan.

Stocks.	Bid.
Manhattan Cons	23
Manhattan M. Co	02
Gold Wedge	04
Seyler-Humphrey	02
Dexter	06
Little Joe	01
Crescent	01
Combination	01
Mustang	11
Cowboy	01
Original Manhattan	03
Broncho	02
Jumping Jack	....
Pinenut	03
Buffalo	....
Stray Dog	08
Yellow Horse	....
Indian Camp	04

Other Districts.

Stocks.	Bid.
Fairview Silver King	....
Fairview Eagle	46
Pittsburg Silver Peak	1.53½
North Star Wonder	....
Eagle's Nest	23

Salt Lake City

Jan. 2.—Following were the closing quotations on the exchange today:

Stocks.	Bid.
Alice	....
Ajax	19½
Butler-Liberal	03
Bullion Beck	85
Beck Tunnel	50
Black Jack	20½
Colorado	2.20
Carisa	....
Copper Glance	10
Columbus Cons	2.00
Cons. Mercur	25
Daly Mining	....
Daly-West	....
Daly-Judge	3.02½
Eagle and Blue Bell	....
Grand Central	2.75
Lower Mammoth	43
Little Bell	1.02½
Little Chief	03
Mammoth	1.75
May Day	24
New York	....
Mountain Lake	28
Ontario	....
Ohio Copper	2.55
Nevada Hills	2.95
Standard Copper	14
Sacramento	03½
Silver King	2.75
Silver Shield	....
South Swansea	....
Swansea	....
South Columbus Cons	50
Uncle Sam	36½
Utah Mining	1.17½
Victoria	75
Victor	05¾
Yankee	23
Iron Blossom	22½
Sioux Cons	14½
Crown Point	16
Seven Troughs	33½

METALS.

New York, Jan. 2.—Lead—Steady; $3.60@3.65.

Lake Copper—Firm; 13⅝@13⅞c.

Silver, 54½c.

St. Louis, Jan. 2.—Lead — Higher; $3.65.

Spelter—Firm; $4.22½.

CORPORATION AFFAIRS AND FINANCES.

Pneumatic Tool.

Directors of the Chicago Pneumatic Tool Company have deferred action on the quarterly dividend. The company has been paying 1 per cent. quarterly.

President Duntley says: "We have deferred action on the dividend until we see how the year opens and what the prospects are, and to see whether the general trade conditions are better or not.

"The money has been earned, but we thought it better policy to take this action. The company has had a very prosperous year indeed."

UNITED STATES TREASURY.

Fiscal year 1907-8:

	Dec. 30.	This month.
Receipts	$2,037,295	$46,052,717
Expenditures	2,250,000	53,760,000
Deficit	$ 212,705	$ 7,707,283

Fiscal year 1906-7:

Receipts	$2,231,285	$53,849,234
Expenditures	1,220,000	44,550,000
Surplus	$1,011,285	$ 9,299,234
	Dec. 30, '07	Nov. 30, '07
Avail cash bal.	$266,928,516	$245,535,266
Of which in banks	259,562,269	236,550,747

National bank notes received for current redemption: This day, $538,992; this month, $10,171,464; fiscal year, $106,121,752; national bank notes awaiting redemption, $10,077,800; 5 per cent redemption fund, $27,157,401.

TRANSPORT AND GAS ENGINES.

In an article dealing with "Transport and Power in Outside Districts," "South African Mines" says: The delivery and erection of machinery often costs more than the machinery itself, and for this reason the outside mines, especially when owned by small companies or syndicates with no great financial resources, are often unable to take advantage of some natural facilities for working. Take, for instance, a number of small mines situated in close proximity to a substantial head of w[illegible]. Under favorable conditions a small central electric plant, which would serve all the mines, would be erected, but the cost of transporting machinery is so prohibitive that the various owners are content to make the best use they can of this head by means of primitive water wheels, etc. It is interesting to note that two or three "larger" mines have, however, recently engaged in up-to-date power schemes where such natural facilities exist. The Penhalonga at Umtali and the Glynn's Lydenburg have, for instance, favored such a policy. We have no doubt that in the course of time, and as transport facilities improve, such projects will figure in connection with districts where a number of small ventures are congregated together, as, for instance, in the Hartley fields of Mashonaland.

A type of plant which is eminently suitable for mines in the outlying districts, and which is being supplied to the Messina Company and to the Transvaal Consolidated Land Company's tin mines near Potgietersrust, is a suction gas producer plant. In districts where fuel is expensive this kind of driving engine is likely to give the most economical and efficient results, and it seems destined to play a very important part in the Northern and North-Eastern Transvaal. Gas engines of small and moderate powers are built in large quantities; their difficulties have been thoroughly overcome, and they have attained to an almost fixed type.

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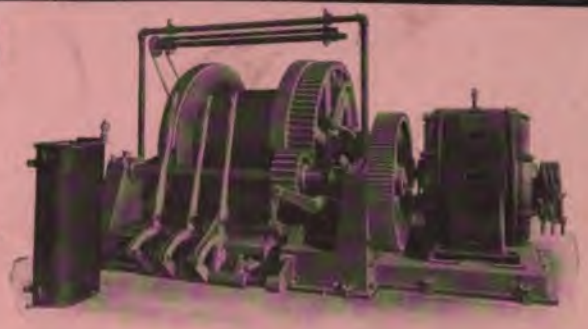

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The Hendrie & Bolthoff Mfg. & Supply Co.

DENVER, COLORADO, U. S. A.

MINES AND MINING

WEEKLY

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MINES AND MINING

A. J. CASEY.....Manager
C. L. HALL.....Editor

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We will be pleased to publish any correspondence relating to mining, milling, metallurgy and kindred subjects, or sharp, clear photographic sketches pertaining to improved machinery, new inventions, mines, mills, smelters, or of any other branch of the mining industry. As a matter of protection and good faith, name and address must accompany such communication.

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Prospecting

On another page of this issue, we publish an article on "Prospecting," by Professor Arthur J. Hoskins of the Colorado School of Mines. Mr. Hoskins has seen many years of practice and has had a chance to note the trend of events in this regard. Owing to the result of conditions, the accessibility of all parts of our United States, one type of prospector—the roving fellow—is necessarily disappearing very rapidly, but some are merely imigrating to Canada, Mexico, and unexplored regions. He will be followed later by the "located" prospector, just as quickly as his day dreams are shattered by enlightment, or the capitalist takes over his property. In many parts of the Southwest and the Northwest, however, such a type will be found for years to come.

In reference to scientific prospecting, which is a new field and unfamiliar to many, the large exploration companies are not merely following upon the heels of the old prospector, but are invading his domain, in fact, outstripping him in the opening of inaccessible regions. One well-managed exploitation company now has two parties in Mexico, each consisting of an experienced technically trained man, assisted by a younger engineer and accompanied by the necessary Mexicans. Their work on prospects is thorough and based on scientific reasoning. What such a party discards should offer little encouragement to the usual old-time ore hunter.

Goldfield Commissioners' Report

The substance of the report compiled by the Goldfield Commission was made public by the President this week.

The gist of the report was that Governor Sparks had overdrawn the conditions existing at Goldfield and that according to the statutes, no interference by the government was warranted.

The commission admits that while there was no insurrection against the power of the state, at the time the troops were called for, and has not been since, yet had the mine operators carried out the program they did, without the presence of federal troops, some disturbance would probably have been caused. Moreover it suggests that such troops as are now in Goldfield shall be retained until the assembling of the legislature.

Although Nevada and the mine owners are blamed for imposing upon the government, we think that as far as all parties are concerned, (Western Federation of Miners, mine operators, government and state), things could not have worked out more satisfactory. Much could be written on why the state of Nevada could and should have maintained the law in Goldfield, but it is very likely that had local troops been used in this matter, they would have not received as much respect from the Western Federation, nor could the situation have been handled so quickly and businesslike. Had one grave encounter occurred it might have precipitated a general mix-up that would have cost the government more in the end than it has thus far. However, with the policy of the mine owners quietly launched, the critical point is over and the state troops should be able to handle the situation from now on.

The report adds that in view of the "union being controlled by men of violent tendencies," there is "considerable danger that serious disorders will be attempted if the troops be withdrawn, and the mine operators insist on carrying out their publicly announced policy." We, ourselves believe that such a disturbance would be likely to happen, for the class of men congregated in a mining camp like Goldfield is notoriously the scum of the Western Federation. A new strike of any kind draws the roving, dissatisfied, ten-day miner, and where the prospects of high grading are so numerous, the attraction is irresistable. Moreover the worst of these men dote on the freedom allowed them in the bar-room and gambling hall, and leave the district only at the promise of newer and livelier excitement in another camp. We firmly believe that the majority of the Western Federation are good citizens, but there are some dangerous types among them, and these will be found in Goldfield.

Senator Owen's Bill

A bill was introduced in the senate last month by Senator Owen of Oklahoma, to provide security to depositors in banks and for the prevention of hoarding currency. It fixes a tax upon all deposits, and from the fund thus created provides for the payment in full of all depositors when a bank is declared insolvent.

The Secretary of the Treasury is directed to maintain a fund of $100,000,000 in treasury notes, which may be loaned upon bonds to ninety per cent. of their value.

The bill provides that advances from it shall be charged for at the rate of six per cent, for the first four months and thereafter at the rate of eight per cent.

Depositors will object to the Owen bill, because it would not be just for them to pay a tax to secure their own money that the banks were having the use of and paying no interest for. If the government exercises paternalism over the national banks let it stand sponsor to the depositor. The banks will oppose the bill, because such a law would greatly lessen deposits and result in correspondingly increased hoarding. Many men of many minds, both in congress and out of congress, have their schemes, but the most of them are as fickle as the wind, illogical, untenable and merely the suggestion of superficial makeshifts.

An Important Court Decision

Of much importance to western mining interests is a decree by the United States Circuit Court of appeals, which insures the continued operation of the American Smelting and Refining Company's plant at Murray, Utah. The order was made public in the United States District Court this week. It is a modification of the injunction granted to the farmers of Salt Lake valley by District Judge Marshall—an injunction which virtually involved the closing of all the large smelters in the state. The American company entered into friendly negotiations with the land owners, and the concessions made are embodied in the decree.

The smelting company may operate its lead smelter at Murray up to its present capacity of 1,500 tons of crude ore every twenty-four hours. This shall be exclusive of flux and fuel, other than sulphur, and this tonnage shall not be more than one-third sulphide. The sulphur contents of the latter shall not exceed twenty-five per cent. when bedded for charging the roasters.

The company, for its part, agrees to maintain an elaborate system of flues and baghouses to collect the sulphur and arsenic which have wrought havoc with the crops.

This decision establishes a precedent and will probably set at rest all future contentions of a similar nature. The smelter fumes have been a disturbing factor in smelting operations in this country for more than a quarter of a century, and this decision appears to give universal satisfaction.

The Growth of the Country

In the general summary of the past year's business, neither the state of Colorado nor the United States have any reason to complain. The recent money stringency, that we are now recovering from, was only a warning to the money kings and the people that they must not attempt to soar above the earth. Out of these disturbances men gather wisdom and throw financial safeguards around the treasure vaults of the nation. They discover the weak points and fence against future calamities.

None of the money of the country has been sunk in the fathomless deep nor destroyed by fire or flood. It is all in existence and more is being created every day. A few financial manipulators brought on this distrust and the people became alarmed and hid their money. Confidence is returning, reason is assuming its throne and the excitement is giving away to confidence and business activity.

We have just harvested the greatest crop ever garnered by any nation in the world. Our granaries are overflowing, and all other departments of industry show correspondingly well. In round numbers the nation's agricultural harvest for 1907 has been computed at 7,200,000,000. Mineral production, $2,000,000,000. The corn crop, $1,340,000,000; wheat crop, $554,000,000; oat crop, $334,000,000; bank deposits, $13,099,963,548.

When we take into consideration the fact of our vast productions of manufacture, and hundreds of other industrial branches, it must certainly swell the grand aggregate to at least $25,000,000,000 of actual wealth added to the nation in the year 1907, leaving the money production and banking interests entirely out of the catalogue.

The wealth of the nation is now computed at $130,000,000,000, and it is increasing in wealth, population and material development far more rapidly than ever blessed any other nation in the history of the world. Judging the future by the past we will reach the $200,000,000,000 mark in the next ten years.

The manufacturers alone in the United States for the fiscal year ending June 30, 1907, amounted to the round sum of $15,000,000,0000. Capitalization of corporations, $40,000,000,000, of which railroads head the list with $15,000,000,000; mining $2,500,000,000, and so on down the line.

Since the war of the rebellion the nation has more than quadrupled its wealth and it is just beginning to pulsate with its mighty possibilities.

Interest and Dividends

Figures compiled by the New York Journal of Commerce show that this month a total of $185,600,000 will be paid in dividends and interest by various corporations, against $180,900,000 in the same period a year ago.

This month's interest payments will be larger, namely, $100,700,000, due to the heavy output of bonds and notes, while dividends are smaller—$84,900,000—because twenty-one industrial companies have either passed or reduced their dividends, as compared with the same month a year ago.

The fact is that current figures represent past rather than present conditions. A summary of the dividends and interest payments by companies is as follows:

Dividend payments—	1908	1907
Steam railroads.	$ 32,312,212	$30,965,200
Industrial.	36,782,617	39,312,212
Street Ry.	7,657,385	7,621,425
Bank and trusts.	8,200,000	8,300,000
totals.	$ 84,952,214	$86,198,837
Interest payments—	1908	1907
Railroads.	$ 73,590,000	$68,500,000
Industrial.	12,800,000	10,500,000
N. Y. Tractions	2,300,000	2,295,000
Gov. bonds	12,714,544	12,000,000
Greater N. Y. City	1,588,000	1,500,000
Totals.	$102,902,544	$94,795,000

A private telegram from Indianapolis, Indiana, this week stated that T. L. Lewis of Bridgeport, Ohio, vice president of the United Mine Workers of America, had been elected president over W. B. Williams by a majority of 60,000 in a total vote of 300,000.

The special session of the Nevada legislature met in Carson at noon on the 14th inst., both houses in their organization retaining all of the old attaches. Including a state ranger bill, it is rumored that several others will be introduced and fought over during the session which is expected to last ten days.

The Homestead works of the Carnegie Steel Company started this week. The Bessemer department is not in operation, but probably will be in a short time. The mills and open hearth departments are running.

Science as a Guide in Prospecting

BY ARTHUR J. HOSKIN, M. E.*

Coloradoans are familiar with the quaint figure and the characteristics of the mountaineering seekers of ore deposits—the prospector. He bears the same relation to our mountains that the cowboy does to the plains; in some ways they are counterparts, and they have both filled important functions in the settlement of the West. Both have been favorite themes for artists, for narrators and for dramatists; so that though we may not have had the realism of intimate acquaintance with these pioneer characters, we cannot be altogether uninformed concerning the lives of such sturdy men who have braved dangers and privations of many sorts.

Persons who have lived in mining communities are familiar with two types of prospector, the roving and the settled. Somehow, when we think of the former, there comes to mind a bearded, roughly clad man, usually accompanied by a "jack," and both packing the outfit consisting of a pick, a shovel, a pan, a few pieces of drill steel, a gun, some blankets, a coffee pot, and a small supply of "grub." If we have in mind, the other type of prospector, we imagine him as living an isolated life in a log cabin, somewhere up in the hills near a nice spring or brook, spending his daytime putting in a few short drill holes, and blasting down a ton or two of worthless rock in a tunnel or shallow shaft, confident that each shot will disclose the treasure. Talk about optimism! I know of no other persons who have such a profound satisfaction in their present, and especially their future, conditions. These men endure many hardships and privations, they can have little converse with other humans, often they can see no provisions for the succeeding day, and, in fact, they receive few benefits of modern civilization—if we except the food-preserving features. Still a prospector keeps on with absolute faith that fort smile tomorrow, a small bill of "grub and powder" is obtained at the nearest camp, on credit that is already strained, and the routine continues.

What guides, or rather impels, these fellows? Is their faith justified? It has many times been my lot to associate intimately with these rare, liberal-hearted optimists, and I have reached the conclusion that most of them are led on by subtle beliefs, which, to a technically trained man, seem like the rankest folly. They are diviners, dreamers. They are disappearing now and, a generation hence, there will be only memories of them. They are giving way to successors of a very different type.

The new kind of prospector is well educated, and perchance, he is rather young. He probably is a graduate of some scientific or technical school and may adorn his name with scholastic suffixes such as M. S. or E. M. His chances of success are many times those of the man he supplants. Why? Because he is taking advantage of the work done by all former prospectors. He is guided by theories deduced from observations through ages, and he has the advice of the best contemporary men of experience in matters of geology as applied to mining. In other words, he is a scientific prospector. The former prospector has, indeed, held strong beliefs, and it cannot be gainsaid that he has added to the world's total of productive mines, but what is to be said of the ninety-nine per cent of such fellows who have failed to put their names into mining history?

Is there, in science, a guide one may follow in the search for mineral substances? The answer is decidedly affirmative, but, at this time, I can do no more than make a few suggestions along these lines.

In the first place, let me say that there is no room, today, for a prospector who does not understand mineralogy and geology. He must also have knowledge of mining methods, that he may know whether a deposit, once found, can be exploited at a profit. He must be familiar with the branches of science which account for all discovered mineral bodies, and his mind must be capable of applying theories to local actualities. If he finds apparent lack of harmony, he must be competent to adjust former theories until they again agree with all known facts. He must be a true scientist, a person who cannot, for a minute, assume to believe a thing which he knows to contradict nature. Furthermore, he must join our latterday scientific men who deem it encumbent upon themselves to proclaim, and not withhold, facts as discovered by them.

There are so many metals and minerals sought for the markets of the world that we see there are many fields for study and practice open to prospectors. A man may prospect for the precious metals, such as platinum, gold or silver; for base metals, such as iron or copper; for coals, asphalts or other bitumens; for gem-stones of many kinds; for rocks of many sorts useful in the manufacture of cements of other commercial processes; or for clays and other earths valuable in the arts.

There are, to be sure, broad, common facts to be learned by the prospectors in the different lines, and yet, there is much that must be thoroughly understood by, say a man searching for gold, that need not be considered by another man who is hunting for soft coal; and vice versa. And think of the knowledge a can must possess if he poses as a prospector for any and all minerals.

It is not uncommon, at Leadville, to find several of the metals, gold, silver, iron, lead, zinc, copper and manganese in paying amounts in the very same ore. Diamonds and gold may be found in precisely similar formations, though in different localities. It is not unusual to find gold in the sedimentary horizons corresponding to coal measures elsewhere. Certain metals are common associates, as for example, manganese and iron or silver and gold. To an experienced man, however, certain other associations would seem incongruous. Gold has been found in every know rock of geologic age. It is, indeed, absolutely true that "gold is where you find it," but it is just as certain that coal will not be found in granite or eruptive rocks of any kind, nor will it be found in any sedimentaries prior to those of the carboniferous age, although it has been mined in about every measure since the beginning of that era. Lead and zinc are found in their greatest abundance in the limestones. Copper somewhat resembles gold in that it is found in a great variety of geologic structures. At Butte, Montana, it occurs in fissure veins traversing granite; at Mansfield, Germany, it is found in beds of shale and sandstone; in Michigan, it is mined from amygdaloid, or conglomerated gravelly deposits; while in Utah and Arizona, famous mines are worked in limestone. Iron is one of the most widespread and abundant elements of the earth, and still it is mined in comparatively few regions, while there is an increasing demand for the metal. Nickel, tung-

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sten and tin are not, as yet, found in many localities, although the demand for them, also, is increasing.

There have recently been published by the United States Geological Survey, a few definitions of fundamental terms in prospecting and mining. I give a few of them here, just to indicate that these subjects are being considered more methodically than ever before, and there is a demand for a uniformity in terms, just as much as in any other branch of science. As these same terms have been loosely handled, with varying meanings, heretofore, it is hoped that hereafter, these definitions will be adopted by all mining men.

Ore is defined as a natural association of minerals from which one or more of the useful metals may be profitably extracted. Pay-ore is such as may, now, be mined at a profit, while non-pay-ore is such as may, in the future, be profitably handled, under new methods and with improved metallurgical processes.

The word gangue may be applied only to the earthy or non-metallic, minerals in an ore, such as quartz, barite or calcite. Objection is raised to using this word to mean metallic minerals, like pyrite or hematite, which may be present in the ores of more precious metals.

A vein is a single ore-bearing fissure. It may be but a tiny crack or a wide chasm in a rocky mass, provided it is filled or mineralized with ore-bearing materials.

A lode is an assemblage of closely spaced veins, so that all may be worked as one deposit. These veins may still be as thin as paper, or may be several feet in width, without violating the intent of this definition.

The term, "true fissure vein," is now considered obsolete. It has been used, heretofore, to designate a mineralized fissure of unknown depth, presumably extending through the earth's crust. Under the new restrictions, if we desire to speak of an ore-bearing fissure of great depth, we may call it a "fissure vein," but we must omit the word "true"; while if we wish to mention a filled fracture which extends through but one formation, as for instance, limestone, we term it a "gash-vein."

We all understand a placer as being a "place" where gold or other enduring metals or minerals, broken down from original ores in place, have accumulated among sands or gravels in present or ancient bodies of water, such as streams, lakes or oceans. Placer deposits are always indications that somewhere, usually above them, there are, or have been, bodies containing the metals or minerals now found in the wash. They have led to the opening of many mining camps. Black Hawk and the camps of Boulder county, for example, originated in the discoveries of gold in the creeks, with the consequent search and discoveries of the original ore bodies.

It is proper, now, to speak of an ore body as a "contact" only when it occurs at the plane of contact of two kinds of rock, without regard to its origin. The expression has been used to mean, in addition to the above sort of formation, another kind of ore body, which is now to be termed a "metamorphic contact." This implies that the ore has resulted from the presence or contiguity of two dissimilar rocks, but it may, or may not, be at the plane separating them. The ore is usually within the body of the more soluble rock, and originated by circulating solutions flowing from one rock into the cracks or joints of the adjacent one. At Aspen and Leadville, we have splendid examples of this type. There are, among the limestones, intrusive sheets of porphyries. It is believed that waters have flowed from these porphyries carrying solvents for limestone, and also containing dissolved minerals. Flowing into the joints of the underlying limestone, these waters have slowely dissolved and substituted, molecule by molecule, until large masses of ore now replace former masses of the original rock.

When we consider the great variety of deposits which are mined for metals, alone, we realize that there is no one elementary statement or explanation that will apply to all. We find metallic deposits in the shapes of veins, as at Central City, in Australia or in Mexico; in lodes as at Cripple Creek and Goldfield; in irregular masses, or metamorphic contacts, already mentioned; in form of pipes or chimneys extending up through the earth like eruptive vents, as at Silver Cliff, Colorado; in stockwerke, or rock fractured and criss-crossed in every direction, the ore being in the crevices, as in the tin mines of Cornwall; in many placers throughout the world; and in many other forms too numerous to explain.

At Cripple Creek, we have the remnant of a volcanic crater, thousands of feet of whose original mass have been removed by erosion. The filling of the crater now is a cemented mass of finely broken lavas, which after solidification, was sheared and fissured with innumerable, minute, cracks in every direction. These crevices were subsequently mineralized by circulating solutions containing compounds of the precious metal, gold. Where these cracks occur associated in bands and approximately parallel, they are mined as lodes; but it is only the contents of the tiny fissures which carry the values. In getting these contents many times their volume of rock must be mined.

The gold and silver mines of Tonopah, Nevada, are deposits in complex masses of eruptive lavas of several kinds, the metals having been brought into the present ore bodies by silicious solutions circulating in the many fissures and fault planes of that region.

Much of the gold of California is derived from the so-called "buried placers," which are the beds of ancient streams that have subsequently been covered by eruptive flows, so that the work of winning the gold is done underground. The famous Rand Bankets of South Africa, are conglomerates, believed by some authorities, to be prehistoric placers, originally marine shore deposits, into which gold was carried by the flow of rivers. The continent rose from the sea after many feet of sedimentary rocks had covered the bankets, and the mining is now done, in some instances, a mile below the surface of the earth. The same is true to a great degree, of the Michigan copper mines, which, as already mentioned, were originally flat beds of conglomerate, but have been tilted up with the other rocks of the region until they stand nearly, or quite, on edge.

Notwithstanding the seeming lack of explanation for the occurrences of the minerals in their multiplicity of ways, there still is absolute reason for them, and the term, Science of Prospecting, might be coined to comprehend the sum of duly arranged knowledge along these lines.

Why, if gold is found in every known rock, do we expect to find it more abundantly in certain formations? Simply because the experience of prospecting has said so. Gold is now presumed to have been a minute constituent of every igneous rock. The original granites of the earth even now carry it in traces, while the later eruptives carry more. These rocks originally contained, also, waters of crystalization, or magmatic waters, which have subsequently been squeezed out, as it were, by the cooling and contraction of the rocks, and, containing solvents for gold, they have carried this metal along with them into the channels of circulating waters. In these passages, they have met other solutions and chemical reactions have resulted, the precipitates enriching the ores; other solutions and reactions account for the gangues. It is natural

therefore, for us to seek gold in places that we believe have originally been open or porous enough to afford channels for circulating waters. Hence, a prospector for gold prefers regions where he knows that the infinite forces of nature have produced fractures, and where there have been flows of igneous rocks. The mountainous portions of the world have been produced by the wrinkling and elevation of the crust; and in the processes of upraising, were inevitable. The fractured rocks offered convenient avenues for the fluid rocks from below. Therefore, mountains are thought to be promising fields for prospecting. We do not believe that the Rocky mountains, for instance, were shaped by any cataclysm, but that they were elevated by the quiet, irresistible dynamics of our cooling globe, and the process is even now on. In our canons, we can see how hard, brittle rocks of many ages have been bent and contorted, and we must believe that they were not thus shaped suddenly, but very gradually. We are assured, by the many balanced rocks, that no violent disturbance or quake has occurred for many ages, here in Colorado. Fissuring also may be a very slow process, and there is no reason to suppose that it and vein filling may not be going on at this time.

We accordingly believe that Nature has been for untold eons, and still is, producting these concentrations of mineral treasure. We cannot know how many times the metals have been dissolved, transported and re-precipitated, each time producting a richer ore, by bringing together in fewer main channels, the values previously distributed. The upper portion of a copper vein may be barren, while two hundred feet below will be found the very richest parts, the easily soluble salts being dissolved out near the surface and re-precipitated in the so-called zone of secondary enrichment. Contrarily, the portions of gold veins nearest the surface are the richest, because this metal better withstands the destructive oxidation and disintegration which reduces the gangue. A decreased amount of gangue thus remains with the original content of gold.

Haphazard discoveries have opened many mines, it is true, but henceforth, the world's mines will be found by intelligent means. The coming prospector will put himself into a harmonious, scientific understanding and appreciation of Nature's profound causes and effects, and he will be just as much a philosopher as any other scientist. The time of mystics, in any line, is past. There are sound reasons for the formations of all mineral deposits, and therefore, there are rational means of going about the discovery of them.

The search for valuable minerals is not to cease; on the contrary, it is in its ascendency. Every large and important mining company now employs its own trained prospectors; but it is a noteworthy fact that they bear no resemblance whatever, to their predecessors, the traditional recluses of the hills, who were guided by chance and superstition.

Let us take a last, fond and farewell look at the odd prospector of the past century, for he is being crowded off the scene just as certainly as is the Indian or any other human being who does not keep step with the progress of civilization and science. Our new prospector wears, with equal grace, the corduroys of the camps and the broadcloth of the best social and learned gatherings. He is a professional man, an educated, trained geologist and mining engineer. When he goes forth to seek minerals, his field equipment is the same as that of his departing namesake, plus a vast store of scientific knowledge.

We are now in the era of scientific prospecting.

Modern Views on Ore Deposition*

By S. F. Emmons.

In more recent times, as the knowledge of ore deposits, through scientific studies, has increased, and the more theoretical questions with regard to them have become frequent subjects of discussion many important changes have been brought about in the views generally held with regard to the origin and manner of formation of ore deposits. It has been actually demonstrated:

1. That deposits in limestone have been formed by directly ascending solutions, of which those of Rico, Colorado, are the most notable instances.

2. That certain deposits in limestone have been formed primarily by direct emanations of mineral-bearing solutions from intruded igneous masses during cooling and consolidation, to which alone the term contact deposits is now considered to be scientifically applicable, since they are characterized by the presence of minerals formed during what is known as contact metamorphism. Up to 1901 there were no published scientific descriptions of such deposits in the United States, but since that time a vast number of important deposits, especially of copper, have been described as properly belonging to this type.

3. That certain deposits, especially of magnetic iron, have been actually formed by magmatic segregation from igneous masses during cooling and consolidation.

4. That underground waters, which are still regarded as the most important vehicle for the transportation of vein material within the earth's crust, are not necessarily all of meteoric origin, as was formerly thought, but may rise from the squeezing out of occluded water from igneous magmas as they cool and contract. That such magmas are giving out water in sufficient quantity to feed thermal springs or to form ore deposits is of course not susceptible of direct proof. It has long been recognized that during volcanic eruptions great quantities of the vapor of water escaped into the atmosphere, but this phenomenon has hitherto been explained as the result of the descent through fissures of ocean waters that came into contact with the rising magmas and thus produced extensive eruptions. Suess, the most prominent advocate of the modern theory, claims that it is not the ocean that feeds volcanoes, but that volcanoes have furnished water to the ocean. Indirect arguments in favor of this theory are found, first, in the observed fact that in very deep mines the lowest levels are relatively or absolutely dry; whence it is assumed that if surface waters do not reach such comparatively shallow depths they can hardly be supposed to have been the vehicle which brought the metals up from the barysphere, which must be fifty or a hundred fold as deep, or even to have reached any very deep-seated cooling magma. Second, European geologists, who have been making very long and thorough chemical studies of thermal waters, claim to be able to distinguish among them, by the relative permanence of their chemical composition and degree of saturation, those which are fed exclusively by cooling magmas, or what Suess calls juvenile waters, from those which are fed exclusively from meteoric waters, or vadose springs, or, again, those which are fed in part from one and in part from the other source.

5. Finally, it is generally admitted that the ores as now found in an ore deposit may be the result of a solution and reprecipitation many times repeated, each process resulting in a concentration of its metallic contents. Most important of these, from an economic view, is the secondary enrichment by surface waters. This was noted by the writer in his original report, as applied to the oxidized ores, but it was not then supposed to be possible chemically that it might go on below the ground-water level in the sulphide zone. This has recently been demonstrated, however, by actual laboratory experiments, and the action is recognized as the most important factor in forming the bonanzas of exceptionally rich deposits.

*From Bull. 320, U. S. Geological Survey, "Downtown District of Leadville, Colo.," by S. F. Emmons and J. D. Irving.

†Of the U. S. Geological Survey.

Experiences of a Young Engineer—IV

Being Letters Bob Braun Wrote to His Former Roommate, Theodore Gillespie in South America

Dear Ted:—

Your continual praises of South America are having some effect upon me. So much so that I have been reading up on the country. I believe all you say of it, but I am not ready to leave the United States yet awhile. Moreover I can't speak a word of Spanish, and haven't time to take it up now, although it may be as easy as you say.

I paid a visit to the property of the Boston Consolidated upon the top of hill which I mentioned in my last letter. The company is stripping off the whole top of the mountain and will mine the ore by the open pit method. The averages values in the ore, as found by repeated assays made during exploration work, runs about 1.6 per cent. copper and ninety cents in gold and silver. The mountain was thoroughly prospected before any of the stripping work was started, and it was found that the whole mountain was mineralized. Tunnels were driven every 200 feet horizontally, and every fifty feet vertically, so the extent of the mineral belt was pretty well known. The waste rock was 180 feet thick in some places, and counting what is already stripped and what is left, the total amount is over 1,300,000 cubic yards. In removing the overburden, holes are drilled with Keystone churn drills to a depth of about sixty feet depending upon the grade of the copper as shown by the drill cores. The holes are spaced about twenty-five feet apart, and are about six inches in diameter.

Stripping on the Boston Consolidated Property.

In one instance fourteen holes were drilled to a depth averaging about 140 feet each, and forty-five tons of powder were used in firing them. In loading the holes the last twenty-five feet was tamped solidly, and the noise was considerable. The foreman on the work told me that the depth of the hole was sometimes governed by the distance from the face, to which the shot had to break.

The broken rock and loose material usually found on a mountain side are removed by steam shovels, which fairly eat their way along the side of the range. I have enclosed a kodak picture taken about a week ago,* which will give you some idea of how the operations are carried on. One of the Keystone drills is shown in the foreground preparing the ground for the steam shovel shown behind. The steam shovel is Model No. 91 of the Marion Steam Shovel Company of Marion, Ohio, and there are three other duplicate machines. Each has a capacity of 7,000 tons per day, and requires two men to operate the brakes, etc. The bucket on each machine will hold five cubic yards or about eight tons of rock. I timed several loads and the average was about nineteen seconds each, giving a capacity of eight tons of rock in nineteen seconds. This, of course, isn't the speed maintained as there are delays for cars, track laying, etc., but it will give you a hint as to how fast the work is done.

BOSTON CONSOLIDATED MINING COMPANY

The Time Card.

The cars which haul the waste rock are low bedded, and hold only one shovelful of material. The track is only temporarily laid, and is quite

*This letter was written in the late spring of 1907.

rough in places. You can see by looking carefully at the picture, the ties used in constructing the track for the steam shovel, and the other one for the cars and engine on the outside. I was informed by the forman that the total cost of stripping per ton loaded on the cars below was about fifteen cents, perhaps a little less.

I haven't made a thorough study of the geology of the camp yet, but have some knowledge of it. The principal rock masses are intrusive igneous monzonite porphyry (or as some call it porphyritic monzonite) and limestone. In the limestone there are large lense-shaped bodies of low grade copper sulphides, very uniformly distributed and formed by replacement of the limestone. The monzonite porphyry is also mineralized. The exploration has shown the Boston Consolidated mountain to be ore-bearing to a depth of 1,500 feet, but below that, it is unprospected. The larger mines here are outputting from 600 to 1,000 tons per day, and as soon as the mills of the Boston Consolidated and the Utah Copper Company are finished at Garfield their output will be materially increased. The cost of production as given by various men in the camp is from six and a half to nine and a half cents per pound. This seems rather low, and I think they are giving the cost at which they expect to produce. I know that some of the managers, for instance, Cates of the Boston Consolidated, are trying to make a record for economy and in one or two cases it leads them into the "penny wise, pound foolish" mistake.

You spoke about the trouble you were having at the Cerro de Pasco in regard to keeping the men's time, and the work it entailed. Consequently I am sending you a form used at the Boston Consolidated, which I believe is as good as any used here. This card is kept in the office and checked up every day by the time-keepers, from a mine note book carried by them on their trips. Some of the names are hard to understand, and our time-keepers call them Nick Carter, Robin Hood, Teddy Roosevelt, Diamond Dick, or the first name that they can think of. Each workman is charged a poll tax which they cannot understand, but have to accept. Most of the foreigners as a rule can speak very little English, but can make out what you say if they try hard enough. It often stands them in good stead to profess ignorance, when really they comprehend.

Well, I must close for this time. Let me hear from you soon.

Yours, as ever,

BOB.

The Lagarrigue-Sutil Process of Gold Amalgamation*

The property possessed by a thin metal leaf, when submerged under pressure in quicksilver, of taking on as a thin coating any powdered substance floating on the surface of the liquid mercury, is the principle of the Lagarrigue process.

The Lagarrigue amalgamator consists of a U-shaped vessel, in the interior of which circulates an endless metallic band. The latter, entering one of the branches of the vessel, carries with it the ore in a state of powder, and an automatic distributor obliges it to pass from one side of the vessel to the other in the form of a thin layer in intimate contact with the mercury. On passing out of the apparatus it is impregnated with rather more than sixty per cent. of its own weight of the latter. The mixture of ore and mercury then goes into a vat or pan, where, by certain mechanical means, such as revolving vanes, etc., a portion of the latter is recovered and returned to the amalgamator.

A certain proportion of the grains of quicksilver will now have lost by oxidation the power of uniting with other grains of the same metal. When the mixture of water and ore in the first vat has reached a consistency of 1½ tons to ½ ton respectively, the contents are passed to a second one, where nearly the whole of the remainder of the mercury is recovered by combined mechanical and chemical action.

The recovery of the mercury by such means is the part of the process invented by Sutil, and for which he has been granted a patent for a term of eight years after the erection of the necessary plant, for which one year is allowed, so that the patent will expire at the same time as that previously granted to Lagarrigue for his amalgamator.

Numerous experiments made by a commission show:

1. That as much as ninety-five per cent of the gold is extracted by the process from ores containing it in a "free" condition.

2. That from sixty-five to ninety per cent. of the gold is extracted from pyritic ores, such as those of Tiltal.

3. That, with an average velocity for the endless band of 1 metre per minute—corresponding to a seven-minute extraction with the apparatus employed—the machine is capable of treating 2½ tons of ore in twenty-four hours, the discharge being on one side only, or if 5 tons per twenty-four hours, with a double discharge.

4. That the capacity of the machine can be augmented by increasing the length or width of the vessel, or the speed of the endless band.

5. That the loss of mercury for ores containing free gold and very little pyrites does not exceed half a kilogramme, or, for pyritic ores, 1 kilogramme per ton treated.

6. That by concentrating the pyritic residues (relaves) on a Wilfley table a further portion of quicksilver can be saved, thus reducing the net loss to probably less than one-half of the amount given in 5, while the commercial value of the concentrates so obtained will more than pay the cost of this extra operation.

*An abstract from "Boletin de la Sociedad Nacional de Mineria," Nos. 116, 117, Santiago de Chile.

Two Large Steel Bridges

Two large steel bridges have just been completed in Arizona on the Gila Valley, Globe and Northern railroad, one of the main lines of the Randolph system.

One of the bridges spans the Gila river, while the other spans the San Carlos river. The combined cost of the bridges has approximated $200,000, and a big force of bridge builders have been at work for more than a year.

With the new structure the railroad officials are confident that the troublesome Gila will not cause them inconvenience and delay again this winter, as it has in the past. Owing to the heavy freight and passenger traffic on the Globe line the washouts have in the past cost the road large sums of money and at times it has been out of commission for several days.

The new bridges are much like the big steel bridge across the Gila on the Maricopa and Phoenix line. The heavy steel work is supported by gigantic concrete piers which were driven down into the bed of the river to the rock bottom.

The completion of the new bridges will shorten the distance between Globe and Bowie by about half a mile.

A suitable grade for tracks in mines is five inches in 100 feet. A grade greatly in excess of this is too heavy for trammng cars up grade, although empty.

The employment of the stadia methods of measurement in surveying is permissible over very rough ground or through a country covered with dense thickets of brush. With care, stadia measurements up to 600 feet may be made with an accuracy equalling the results attending tape measurement under similar conditions.

Costs, Methods and Records*

By W. A. MacLeod, B. A., B. Sc., A. O. S. M.

The necessity for devoting much attention to systematic records of output, cost, and other matters is not readily apparent in the case of very small mines. On the other hand, with mines like Mount Morgan or Mount Lyell, it will be readily recognized that a manager will be simply overwhelmed with detail, which would seriously interfere with proper supervision, unless careful record of detail are daily kept and then grouped and summarized for monthly statements, and these monthly statements in turn carried progressively forward for half-yearly or yearly statements. Unless such detail is kept the manager can only say that his total costs are going up or down, but cannot lay his finger definitely on the bad spots, nor on those where any improvements have been effected. The necessity for such records is now universally admitted, and it is the main object of this paper to consider how far such methods should be carried in the case of smaller mines, for it will be admitted that a mine employing twenty men underground and four in the office is, to say the least, peculiarly organized, and that by way of contrast a mine employing 1,200 men below and only two in the office is even more badly organized. What, then, is the proper relation to maintain between the works and office staff? I do not intend to definitely answer this question, for there is room for a slight, though not great difference of opinion on the matter, but I will indicate what I consider a reasonable and profitable adjustment, and also consider three r four practical examples, and there again indicate the records necessary, the methods of keeping them, and preparing therefrom the necessary reports, monthly, quarterly, or half-yearly, as the case may be, assuming, as we are all well acquainted with it, the usual relations existing on this field between mine and head office.

The "Prospect."

The most primitive attempt at cost keeping is that of the "bank pass book;" three or four of us run a small prospecting show, employing two or three men, who raise a few tons of stone, and have a crushing; we pay the wages from the returns, or the returns plus calls, and as the months go by we keep one eye on the bank pass book, and when things are bad the banker gently informs us of our limit. The bank pass book is our barometer, and tells us, roughly, where we are. No secretary as yet has appeared on the scene; generally the member of the party who is supposed to know most about figures has charge of the bank pass book. It will be pleasant to assume that our claim is doing well, so well that we have no difficulty in floating a small company. A secretary is appointed, who opens the necessary books for handling scrip, calls, and other matters. The tonnage and returns increase. If now at the beginning of a half-year, the manager makes a list of the stock in hand of stores, fuel, etc., and does the same at the end of the half-year, he will be able to say, having kept a record of the tons of stone raised, that, for instance, his total expenses—wages, stores, fuel, etc.—for winning 2,000 tons were £2,250, or £1 5s. per ton. Supposing that the mine has no mill, and pays 10s. per ton for crushing, total costs are then £1 15s. per ton; assuming that office expenditure is £3,250, and costs £1. 15s. per ton; and you will see that already we have gone into a little detail or analysis in splitting costs into mining 25s., and milling 10s. The mine gradually improves, and a mill and cyanide plant are erected, and the following half-year we have a little more detail, say, mining 21s. per ton, milling 7s. 6d. per ton, and cyaniding 6s. per ton; or a total cost 34s. 6d. per ton. You will note that there is a greater saving here than at first sight appears, for it is safe to assume that cyaniders purchasing sands figure on some profit which now goes to the company. The analysis of costs has now been carried a little further. Assuming that the output steadily increases, the next step would be to split each of the above three divisions into two subdivisions—e. g., mining costs are split into wages and stores, including fuel with stores; similarly milling and cyaniding costs would be sub-divided, giving an analysis with six sub-divisions. As the mine progresses the paysheets, accounts, and output become sub-division as the following is made: Mine wages are subdivided into stoping developments, winding, haulage, and maintenance.

Mine stores are sub-divided into stoping, development, fuel, and maintenance, and mill cyanide costs also split up in four or five sub-divisions each. And, again, if the mine still further extends its operations, further sub-divisions are made. For instance, the Crown Reef Gold Mining Company divides mining expenses into general costs, stoping, drifting, rising and sinking, trimming, banking and winding, timbering, platelaying, pumping and stone crushers, and each of these, again, into three to five sub-divisions. Every additional sub-division of costs entails further office work, and it will be gathered from the foregoing that the extent of operations naturally governs the number of hands on the office staff. This last general statement I will endeavor to make more definite by considering several practical examples. There are three mines employing fifty, 200 and 500 men respectively, and stores and other expenses are roughly proportional to the pay-sheets. What records are necessary, what analysis of costs, and what office staff are justifiable in each of these cases? I am considering here only the staff, that at the mine office, and not at the head office.

The Small Show.

The first case instanced, that of a mine employing about fifty men, is very common here, and elsewhere. We will first consider the record necessary. Generally in small mines of the size under consideration, the only officers are the manager and the secretary; the latter generally is not on the mine, and is paid, perhaps £50 per annum for keeping the head office books and attending meetings. Under such conditions much of the detail work falls back on the manager, and I would here state that any system of cost keeping which throws such clerical work on the manager is defective, and cannot be recommended. In the case under consideration by far the largest item of expenditure is wages, and the greater part of the manager's time should be given to personal supervision of underground work. Assuming for the present that the manager has to keep all records and books, he will find that the following of some similar set of books will meet the requirements of the case. Brace tally book, ruled in columns for stone, mullock and water; weighbridge tally book, or other record of stone sent to the mill; mill record giving daily entries of amalgam and periodic entries of retorted and smelted gold and concentrates, or other product, with assay value and selling price. The manager should inspect this record daily in order, as far as possible, to keep his stopes in touch with returns. Development measurement book, for recording current and total development of different work on hand; stope output tally book, for entering records from tally

*Paper read before the North Queensland Mining and Mill Managers' Association.

boards of truckers from different stopes; time books, for daily entry of time of all hands; wages' book, made up fortnightly or monthly, as the case may be; income tax return book, to be made up by the secretary; accident insurance books, as may be required by the insurance companies; invoice book, for entering copy of all invoices for stores, fuel, etc.; a plain book ruled with double money columns answers well, the total of each invoice being extended into the second column and the extended total added up each fortnight, and the progressive total carried forward. Correspondence with a mine of this size will be small, and outward. A Lett's Diary, quarto size, is convenient for sundry memos, measurements, etc., and for writing any engagements or other matters of interest. Local conditions may demand other records or modifications of the above; for instance, if a mine is systematically sampled and assayed, records are necessary for this purpose.

The increasing demands of the government for returns for statistical or other purposes is throwing more work on the shoulder of the mine manager, and considering this and other matters I am of the opinion that the manager should be relieved of most of this by obtaining some clerical assistance. All that is required is a youth with a slight knowledge of bookkeeping; he will enter all tallies, make up the pay-sheet, keep the income book, measure or weigh all stores purchased, keep closely in touch with quotations for all stores, fill in insurance and other returns, and in any spare time he can either elaborate the above books to give more detail, or the manager can find some useful light work on top for one file will do for inward, and a carbon letter book is very convenient for him. The manager will simply have to supervise his work, and will be relieved of much wearisome detail, and will much more than compensate for the slight extra expense by the extra attention he is able to give to the more important work at the mine. For such mines we are considering elaborate analysis of costs is hardly expected in a balance sheet and report. It will be quite sufficient to split mining costs into wages, stores and fuel, and if possessing a mill and cyanide plant a somewhat similar sub-division there will answer. This latter part of the analysis would necessitate keeping separate books for the latter departments, which means more work than could justly be expected of the manager alone, but with one assistant this could easily be managed.

The Small Mine.

We will now take another example, say, of a mine employing about 200 men, and possesing its own mill and cyanide plant, which employ, say, fifty men. Naturally from a mine of this size, where expenditure is large, a fair amount of detail is looked for. Considering first the mine, the following or similar set of tally books, which are always filled in "on the job," and not in the office, will give the necessary detail for entering in the office books: Brace, stope and development, and weighbridge tallies; coal and timber received tallies; fuel consumed tallies; tool sharpeners, smiths', engineers' tallies of work done; time books; shift bosses's records of labor, showing number and wages of men in each face or working place; amalgamator's record, giving all details of daily mill returns; requisition books for stores issued. If at any time any extra details are wanted—for instance, suppose we are comparing the maintenance costs of different types of rock drills—a small tally book can be opened, with two or three pages for each machine, in which are entered all spares used, and fitter's time, and so on with any other matter of interest that may crop up. All the tally books mentioned are small books suitable for the pocket, and are in daily use, and as they cannot be kept clean the more important of them are entered up each day in the office into the office records. All the stone, mullock, and water tallies are entered into an output record book, so arranged as to conveniently give figures for periodic reports. Similarly, a record is kept for the stone raised from each stope and development face. A maintenance book for entering up the tallies of work done by smiths, fitters, etc., also record book for entering the time from the time books.

The usual letter book and file and index will answer for correspondence. For handling stores, ones are usually handled satisfactorily verbally. Then follows the invoice book, and before entry all invoices should be carefully checked with the goods on delivery, and the cost of all items checked. From the invoice book, the separate items of each invoice are posted to the stores ledger (or stock book). Stores issued are posted up to the "delivered" side of the stores ledger. The proper entering of stores issued on these slips is important, as on it depends the analysis of stores used or issued; consequently whenever stores are given out the name of the department issuing them should be entered on the slip. A stores issued book serves to summarize for the fortnight or month all stores issued. The mine ledger further summarizes the monthly totals taken from the preceding books. The mine manager has as before to keep the records demanded by the government, and to furnish a fortnightly report to the directors of all work done in the mine. Further records of shaft repairs, rope tests, assays, and other matters may be necessary, and if much fuel is used records of the power plant are advisable.

Although the foregoing seems a somewhat formidable set of records and books, still, when systematically kept, the work is not beyond the powers of one good accountant, provided the store and office are adjacent. At night time the store key can be given to a driver or watchman, who is made responsible for recording any stores issued then. At the mine and cyanide works somewhat similar records are kept, though usually they are not quite so heavy, and can be satisfactorily kept by a youth with a little knowledge of bookkeeping. Where one department does work for another—for instance, the mill shop does repairs for the mine or cyanide works—a journal is the most convenient method of keeping an accurate check of all such transactions, the journal entries being posted up to the respective ledger before making out the monthly costs for each department. For half-yearly or annual reports more detail than in the case of smallr mines can be given. Under mining, wages can be split into stoping, development, winding and haulage, maintenance, and general; stores, somewhat similarly. Fuel can be separately shown, and under milling and cyaniding the analysis of cost can show wages, stores, fuel, maintenance, cartage or transport, and general expenses. I wish it clearly understood that the above is not laid down arbitrarily, as no two men will likely arrange the system of tallies and records in the same ideas as to how such detail is necessary, yet the point is that as expenses increase, it is advisable to proportionately devote more care to details in cost-keeping.

The Considerable Mine.

The third case of a mine employing about 500 men I will briefly touch on. More detail is here necessary, and the transactions in all departments are more numerous, hence the office work is heavier, and instead of an accountant and a youth, a staff of four or five will probably be necessary. A storeman will look after the stores and keep the stores ledger, one clerk will handle time book, pay sheets, and income tax returns, another general

tallies and the invoice book, and the accountant will generally supervise and will be responsible for the preparation of the monthly cost sheets. That is only a rough outline of duties, and it must be varied to suit the particular circumstances of each mine. As regards the cost analysis, further detail will be given. For instance, under wages in mining costs, the item of winding and haulage may be split up into trucking, underlie, haulage and hoisting, which would necessitate more work on the wages analysis. It may be said briefly that as the operations increase the cost keeping will naturally follow, and as a manager notices some one item in any department assuming fair dimensions in his monthly costs, it will generally pay to keep more detailed costs of it, and the general result in mining, as in other business, is that some saving considerably more than covers the cost of the extra clerical work. The limits to which this detail should be carried cannot be exactly defined, but common sense will form a good guide. With a just amount of clerical assistance the work of the manager is lightened and economy results. I would say, in conclusion, that all cost-keeping depends on carful entry of all tallies, and in some works on mine accounting I have been disappointed at the meagre treatment of this section of the work and the somewhat undue prominence given to the purely office work. The foundation of all structures must be secure, and in mine accounting the tally books take the place of the fundations. If they are not suited to the work, or are inaccurately kept, the office work must be inaccurate, and the costs of statements unreliable. No cost analysis is absolutely accurate, but a reasonable and satisfactory degree of accuracy can always be obtained at moderate cost by careful tally keeping, followed by similar care in the office work; and in the foregoing I have tried to indicate how far in my opinion a manager is justified in going into detail in this part of his work.

PLACER OPERATIONS ON THE SAN JUAN RIVER IN UTAH.

(Staff Correspondence.)

Considerable prospecting is going on along this valley for placer gold. The entire San Juan river bottom for hundreds of miles prospects in placer gold. In places it is found at the rate of one to two dollars per cubic yard, and in the more lean patches five to fifty cents. Below Bluff, Utah, a heavy company, composed of California miners, has been operating for the past fifteen years with a plant costing $75,000, including ditches and other equipment.

A dozen minor companies have operated to a limited extent at different points along the river, but, as a rule, the gold is very fine indicating that it has been moved by the action of water, chiefly in flood time, for long distances although the coarser, in all probability, came out of the gulches and canons that skirt the river and have their sources in the mountains further back. Much of this gold, without doubt, originated through the decomposition of the rocks surrounding the sources of the San Juan river in Mineral and Archuleta counties, Colorado. But the mountains that stand away on the north side of the river, from its source to its junction with the Rio Colorado, abound in gold in place, while their gulches, gorges and gravel bars are rich in placer gold, and the time is not distant when thousands of men with improved appliances will be digging it out.

Placer Mining Along the San Juan River.

C. L. Tripp of Boulder, Colorado, a well known mining man, has been looking over the country there, and prospecting along the river for 150 miles to satisfy himself as to the facts. On some of the benches of the gulches and river bottoms he finds rich deposits of flour gold running from ten cents to $2 per cubic yard, and himself and associates have already established a small plant of twenty cubic yards capacity of ten hours, from which they are cleaning up an average of $20 a day, or $1 per cubic yard of material handled. The plant consists of a steam boiler, and fifty feet of hose to handle the necessary water. A three-foot, thirty mesh rotary screen is used and a small steam engine. The sand handled is very fine as well as the gold. But by this preliminary process very little of the yellow metal escapes. The product is strictly flour gold.

This flour gold, after it leaves the screen passes on to a sluice way, which conveys it to a Pierce amalgamator where it is finally caught and a close saving made. The product also contains quite a per cent. of silver in a similar state to the flour gold. These values are so fine that they cannot be saved by straining the amalgam through buckskin or canvas, but it has to be retorted. That is the only way the separation has successfully been made, and that has to be done with great care lest the gold volatilizes. About the most satisfactory way is to burn out the quick and silver with nitric acid. The gold can then be washed, weighed and shipped to the mint.

All over this region both gold and silver are free and the Pierce amalgamator makes a very close saving of these elusive values. The tarnished gold, of which there is considerable in this region, is more difficult to save, as it will not amalgamate unless it is free from all rebellious minerals.

Mr. Tripp says while his small plant is making money, they want to greatly enlarge operations and are working hard with that object in view. He is going to Farmington, New Mexico, in a few days to make more thorough tests of the material and its values in that vicinity, including the most improved machinery that will handle the greatest amount of the sand and gravel, and save their values at the least possible expense. He stated that wherever he has made careful and thorough tests along the San Juan river, he finds the prospects highly encouraging, and he proposes to introduce the most improved methods suited to the material to be handled.

As a rule the material is easily and cheap handled, and the problem is as to the best method of handling the greatest amount and saving its values.

The Use of Graphic Formulæ in Metallurgical Calculations*

BY DAVID H. BROWNE

The daily records of furnace practice, the charge sheets, analyses, blast records, etc., are of value only in so far as they leave a permanent record in the minds of the furnace superintendent and his foremen, which record is termed "experience." As all these data, daily accumulating, become in time too numerous for the mind to carry, it is necessary to reduce them to terms of some common denominator and to group them in ways that will make them understood. In furnace practice also certain calculations are daily necessary, and these may be reduced to simple tables or charts.

The purpose of the present paper is to outline methods whereby the records of one particular ore may be tabulated and reduced to graphic formulæ. If a standard method, applicable to all ores, could be devised, then the science of metallurgy would approach the status of an exact science.

Suppose, for illustration, we have a large ore body consisting of chalcopyrite, pyrrhotite and diorite, and suppose that we have found by experience that the ore is regular in composition,

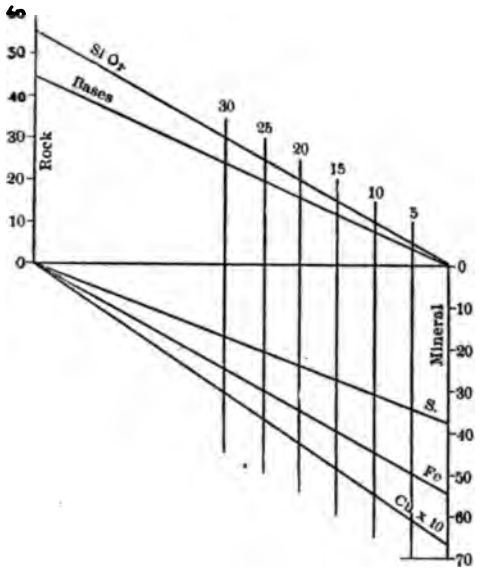


FIG. 1.—DIAGRAM FOR FINDING PERCENTAGE COMPOSITION.

varying only in the relative proportions of minerals and rock. A fair average analysis is, we will assume, as follows: 4.50 Cu, 40.06 Fe, 25.66 S, 18.20 SiO_2, 6.30 Al_2O_3, 3.00 CaO, 1.20 MgO.

We have first to reduce this to its mechanical composition, considering it as a mixture of chalcopyrite, pyrrhotite and rock. Starting with chalcopyrite we have the analysis and ratio of this mineral to guide us.

Chalcopyrite: Cu 34.5 per cent=1,000 parts; S, 35 per cent=1,014 parts; Fe 30.5 per cent=883 parts.

The ore has 4.5 per cent. copper, therefore, to form chalcopyrite this copper must be combined with iron and sulphur in the following amounts: S=4.5×1.014=4.56 part S and Fe=4.5×.883=3.97 parts Fe.

We have in the ore as chalcopyrite: Cu=4.5 per cent., S=4.56 per cent., and Fe=3.97 per cent.; total 13.03 per cent. chalcopyrite.

Deducting this sulphur and iron from the amounts in the original analysis we have: S=25.66—4.56=21.1 sulphur left, and Fe=40.06—3.97=36.09 iron left.

Taking this 21.1 parts of sulphur left, we combine it with enough iron to form pyrrhotite, of which the analysis and ratio is: Fe 61 per cent.=1,564 parts, and S 39 per cent.=1,000 parts.

The iron combined with the remaining sulphur is: Fe= 21.1×1.564=33.0 per cent. Fe as pyrrhotite. We subtract this from the iron we had left after the chalcopyrite was salisfied: 36.09—33.00=3.09 iron left. This must be combined with oxygen, and as such will form almost 4 per cent. iron oxide.

We can now reconstruct the mineral portion of the ore as follows:

	Cu	Fe	S
Chalcopyrite	4.5	3.97	4.56
Pyrrhotite		33.0	21.1
	4.5	36.97	25.66

Raising this from a total of 67.12 to 100 per cent. we have 6.7 per cent. Cu, 55.0 per cent. Fe, 38.2 per cent. S.

The rock materials which are left are:

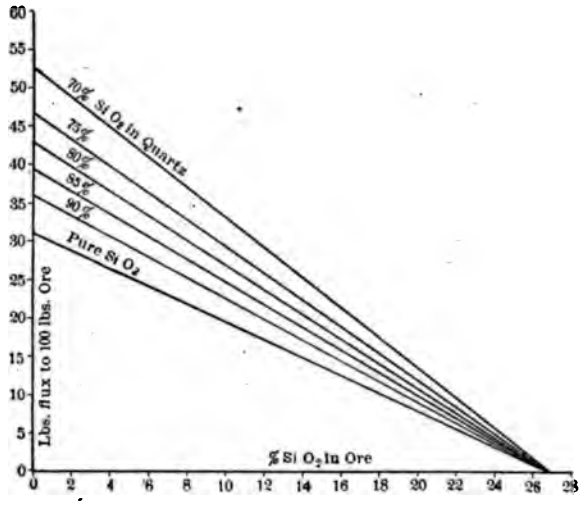


FIG. 2.—FLUX CHART.

		Per cent.
FeO	4.00 =	12.2
SiO_2	18.20 =	55.65
Al_2O_3	6.30 =	19.26
CaO	3.00 =	9.1
MgO	1.20 =	3.6
	32.70	99.8

For metallurgical purposes we can group these constituents as 55.65 per cent. silica and 44.2 per cent. bases.

We have now the mechanical composition of the ore as 67.12 parts mineral, containing 6.7 per cent. Cu, 55.0 Fe and 38.2 S, and 32.70 parts rock, containing 55.65 per cent SiO_2 and 44.2 bases.

We can now assume that any ore from this mine will, in large quantities, correspond to some definite mixture of this mineral and this rock, and we can plot a chart showing what the composition of any such mixture will be.

Lay off on quadrille paper a base line containing 100 horizontal divisions. At the left-hand end erect a perpendicular, which we will call "rock." Lay off on this rock line the distances from the base line corresponding to the percentage of silica and bases in "rock," and connect these points with the zero at the right hand end of the base line. From this zero at the right hand end of the base line drop a vertical, which we will call "mineral," and on this lay off with the same scale distances corresponding to the Cu, Fe and S in the mineral. Con-

*A paper presented at the Toronto meeting of the Canadian Mining Institute.

nect these points with zero at the left-hand end of the base line.

We have now, Fig. 1, a vertical cross-section of which at any point will give the percentage composition at this point. For the sake of clearness we can lay out the copper contents on a scale ten times that of the other constituents.

Let us take silica as a standard, and lay off on Fig. 1 vertical lines corresponding to 5, 10, 15, 20, 25 and 30 per cent silica. We can now read off the ore composition for variations of 5 per cent. silica.

For example: 20 per cent. SiO_2, 15.5 bases, 24.5 sulphur, 35.5 iron, 4.30 copper.

We can now draw up a slag chart covering the grades of ore we most commonly use. We take the pure mineral and calculate the proper slag for it; then we calculate the slag for an ore containing 20 per cent. silica. By plotting these and continuing the lines we obtain a slag chart for ore of any composition between pure mineral and pure rock.

The pure mineral contains 6.7. per cent. Cu, 55.0 Fe and 38.2 S.

This sulphur will be roasted to 12 or 13 per cent. before coming to the smelter bins. This does not alter the slag calculation. We decide to make a matte carrying 40 per cent. copper and a slag carrying 33 per cent. silica. It is well known that copper mattes with 79 per cent. copper contain no iron, and that 64 per cent. iron mattes carry no copper. So by plotting copper on a vertical scale and iron on a horizontal, and connecting 79 per cent. Cu with 64 per cent. Fe, we get a diagonal line showing the amount of iron in mattes of any copper content. From this we find that a 40 per cent. copper matte carries 32 per cent. iron.

We make, for the present, no deductions for slag loss, but calculate as follows: 6.7 parts copper forming a matte containing 40 per cent. Cu and 32 per cent. Fe will take 5.36 parts Fe into the matte. The mineral has 55 parts iron, and after deducting the iron which goes into the matte we have 49.64 parts iron to go into slag. One part iron makes 1.28 parts iron oxide, so 49.64 parts iron make 63.59 parts iron oxide. We have, therefore, 63.59 pounds iron oxide from 100 pound mineral, and we have to add silica so that the silica is 33 per cent. in the slag.

Let x=silica to be added, then x=.33 (63.59+x), and x=31.3 pounds silica. Therefore, 100 pounds pure mineral requires 31.3 pounds silica. Take now the ore mixture with 20 per cent. silica, which we found to contain: 20 per cent. SiO_2, 24.5 S, 35.5 Fe, 15.5 other bases and 4.3 copper.

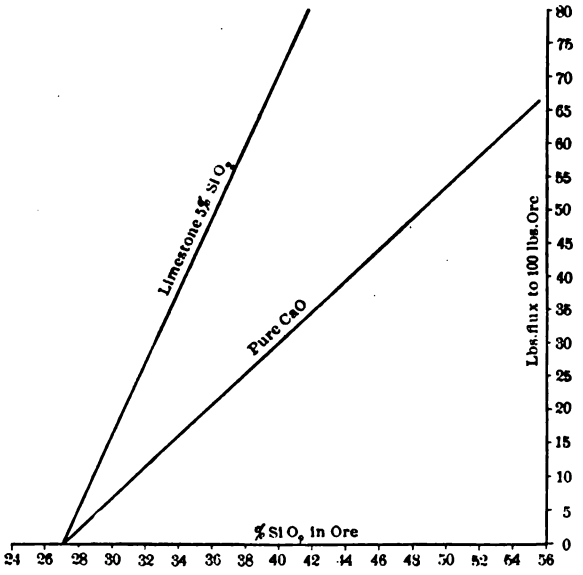


FIG. 3.—FLUX CHART FOR ORE WITH MORE THAN 27% SILICA.

This 4.3 parts Cu passing into matte requires 4.3×0.8 Fe=*3.4 pounds Fe. Deducting this from 35.5 Fe we have left 32.1 pounds Fe to be slagged. Calculating this to iron oxide, 32.1×1.28=41.0 pounds iron oxide to be slagged. The total ingredients passing into the slag are: 41.0 per cent. iron oxide, 15.5 other bases, 20.0 silica (sum 76.5 per cent.)

*Every 40 parts copper requires 32 parts iron to form matte, therefore 1 part copper requires 0.8 iron.

We have to add to this 20 pounds silica a certain amount x of outside silica, so that 20+x will be 33 per cent of 76.5+x, hence x=8 pounds silica.

We have thus found that a pure mineral requires 31.3 pounds silica and an ore with 20 per cent. silica requires 8 pounds silica. We can plot these on a chart and read the amount of silica required for ore of any silica content. Such a chart is drawn in Fig. 2.

As we never have pure silica available for flux, we must lay off on the chart other lines corresponding to the amounts of quartz needed with varying silica content. Each 1 per cent. of bases in the quartz abstracts 0.33 per cent. of silica, so that a rock with 33 per cent. silica would have no silica available. We can lay out a table showing the flux value of various grades of quartz.

Per cent. SiO_2 in Quartz.	Per cent. SiO_2 Available.	Lbs. Quartz to Equal 100 Lbs. Pure SiO_2.
100	100	100
95	93.35	107
90	86.7	115
85	80.05	125
80	72.80	137
75	66.75	150
70	59.20	169
65	53.45	187
60	46.80	213

We can now plot on Fig. 2 the lines corresponding to the various percentage of silica in the quartz used for flux. The pure mineral takes 31.3 pounds of pure silica. If a quartz with 90 per cent. silica is used, we have to take 31.3×1.15=36 pounds of this quartz. Making out a table of this we have: 100 pounds mineral requires 31.3 pounds silica; 36.0 pounds 90 per cent. quartz; 39.1 pounds 85 per cent. quartz; 42.8 pounds 80 per cent. quartz; 46.9 pounds 75 per cent. quartz; 52.8 pounds 70 per cent quartz.

A similar calculation can be made for ore containing 20 per cent. silica: 100 pounds ore at 20 per cent. silica requires 8 pounds silica; 9.2 pounds 90 per cent. quartz; 10.0 pounds 85 per cent. quartz; 10.9 pounds 80 per cent. quartz; 12.0 pounds 75 per cent quartz; 13.5 pounds 70 per cent. quartz.

Dotting in these points in their proper position and drawing the lines we complete Fig. 2.

We can now read off the amount of flux needed for any per cent. silica in the ore mixture. For example: The ore is 13 per cent. silica; the quartz the same day has 80 per cent. silica. Finding 13 per cent. silica on the base line we follow it up and find it intersects the 80 per cent. silica line at 24 pounds. Therefore, 100 pounds of this ore will require 24 pounds of this quartz to make 40 per cent. matte and 33 per cent. slag.

These lines, it will be noted, all in-

tersect at 27 per cent., showing that an ore with 27 per cent. silica and with the other constituents as shown by Fig. 1, is self-fluxing for a 33 per cent silica slag. We may prolong this chart and see that ores with more than 27 per cent. silica require the addition of a base, such as lime, or an iron ore, or a basic copper ore.

We will take limestone as an example, and assume we are using the same ore, making the same matte and slag, and using lime as the added base. Start the calculations with the pure rock which accompnies the mineral in our ore. This rock, by the calculation, contains 55.65 silica and 44.20 bases. We desire to make this into a slag with 33 per cent silica and 67 per cent. bases. Evidently the amount x of added lime must be such that $44.2 \times x = 67$ per cent. of $100+x$, hence $x=66$ pounds CaO.

We can now make Fig. 3, laying off on the right-hand side a vertical on which we mark 66 pounds lime above the point showing 55.65 per cent. pure silica. As 27 per cent. silica ore is self-fluxing, we can draw a diagonal from this point to 66 pounds lime, and we have here a reading of the amount of lime needed for all ore between 27 per cent. silica and pure rock.

But as on the silica side we have no pure silica available, so on the lime side we have to work with crude limestone, and we have to make a table showing the flux value of these limestones. A pure silicate of lime with 33 per cent silica carries 67 per cent. lime, or simplified, 1 pound silica equals 2 pounds of lime. So in a limestone with 5 per cent. silica, this 5 per cent. silica neutralizes 10 per cent. lime and cuts down the fluxing power of the limestone. We make a table of this:

% Silica in Limestone.	% CaO in Limestone.	% Available CaO.	Lbs. Limestone to Equal 100 CaO.
0	56	56	178
5	53.2	43.2	231
10	50.4	30.4	328
15	47.6	17.6	568

Suppose in the present instance our limestone has 5 per cent. silica, and as we have shown 100 pounds pure rock needs 66 pounds pure lime, we multiply 66 by 2.31 and find that 152.4 pounds of this limestone are required.

We can now complete, Fig. 3, laying out the lines for pure lime and for any grade of limestone we have available.

Suppose we have an ore with 38 per cent. silica, Fig. 3 shows that 100 pounds such ore requires 60 pounds of our limestone. We can check this readily. From table 1 we find that this ore carries 38 per cent. SiO_2, 18 iron, 30 other bases, 12 sulphur and 2.0 copper. This copper requires 1.35 pounds iron in matte, which leaves 18 —1.35=16.65 pounds iron to go into slag. Multiplying 16.56 by 1.28 gives 21.3 pounds iron oxide to be slagged. The slag constitutes are 38 per cent. silica, 21.3 iron oxide, 30.0 other bases (sum, 89.3 per cent.). Or adding together all the bases we have 51.3 per cent. total bases and 38.0 per cent silica (sum, 89.3 per cent.). We desire to make slag with 33 per cent. silica and 67 per cent. bases. Therefore $51.3+x$ CaO=.67 $(89.3+x)$ and $x=25.8$.

Looking up table 3, we find this checks out almost exactly. But our limestone has 5 per cent. silica. Now, 5 per cent. silica leaves 95 per cent $CaCO_3$, or $95 \times .56 = 53.20$ CaO in this limestone. As 1 pound silica in the slag neutralizes 2 pounds bases, so 5 pounds silica in the limestone neutralizes 10 pounds CaO—so we have 53.20 —10=43.20 available CaO. We have to us 25.8 pounds CaO, therefore, we

use $25.8 \times \frac{100}{43.2} =$ [illegible]

59.7 pounds of our limestone. Referring to Fig. 3 we find 60 pounds indicated, which proves the accuracy of our chart.

We could, however, have made this calculation in a much simpler way. From Fig. 2 we saw that the pure silica line ran from 31.3 pounds required for pure mineral down to none for ore with 27 per cent. silica. If we prolong this silica line diagonally to the right below our base, Fig. 4, we get a chart showing excess silica or negative silica, which if taken from the ore would make it self-fluxing. We have seen that in our slag, 1 part silica equals 2 parts lime, so if we read off our negative silica and multiply it by two, we get the amount of lime it requires. For example, on this chart an ore with 32 per cent silica has six points excess, or minus silica as shown by the lower

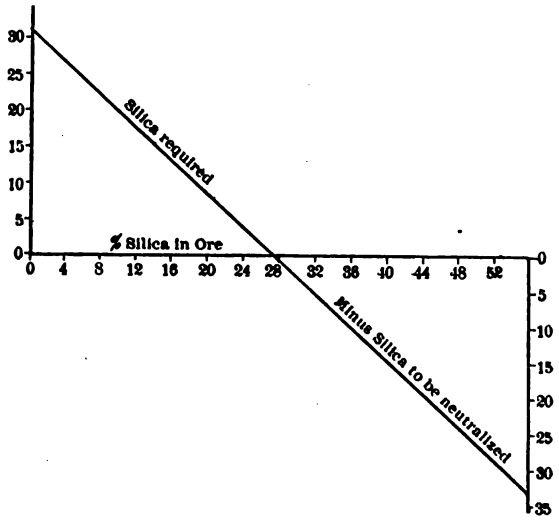


FIG. 4.—COMBINATION OF FIGS. 2 AND 3.

silica line. Multiply by two gives 12 parts CaO to be added, which coincides with the amount of lime to be added, as shown by Fig. 3. Again, ore with 40 silica has fifteen points minus silica, which means 30 parts lime, which also checks out by Fig. 3.

We can in the same way plot mixtures of two or more ores in any fixed proportion. If the regular furnace charge be a mixture of two ores, the resultant mixture may be charted and a third ore figured as a flux. For example, if we have a mine A yielding silicious ore No. 1, and a mine B yielding an irony ore No. 2, we may dcide on a standard mixture of, say, 1,000 pounds No. 1 to 2,000 pounds No. 2. This mixture can be charted and taken as a standard on which we may calculate the required amount of a limey ore No. 3.

Another interesting use of the graphic method is shown in Fig. 5. Suppose the standard furnace charge is 12,000 pounds of roast ore, and that this roast ore varies between 10 and 15 per cent. sulphur; and suppose, further, that it is desirable to keep the sulphur contents constant at 13 per cent., and that we have a green ore containing 30 per cent. sulphur with which to raise the amount of sulphur in the charge. We can lay out a chart showing just how much green ore must be added to roast ore of any sulphur content in order to raise the sulphur to any given percentage.

We start the calculation with some standard weights, for example: 12,000 pounds roast ore and 4,000 pounds green ore, as follows:

12,000	pounds roast ore at 10% S	= 1,200	pounds S
4,000	pounds green ore at 30% S	= 1,200	pounds S
16,000		2,400	= 15% S
12,000	pounds roast ore at 11% S	= 2,320	pounds S
4,000	pounds green ore at 30% S	= 1,200	pounds S
16,000		2,520	= 15.7% S
12,000	pounds roast ore at 12 S	= 1,440	pounds S
4,000	pounds green ore at 30% S	= 1,200	pounds S
16,000		2,640	= 16.5% S
12,000	pounds roast ore at 13% S	= 1,560	pounds S
4,000	pounds green ore at 30% S	= 1,200	pounds S
16,000		2,760	= 17.27% S
12,000	pounds roast ore at 14% S	= 1,680	pounds S
4,000	pounds green ore at 30% S	= 1,200	pounds S
16,000		2,880	= 17.9% S

Lay out on a vertical line at the left the different percentages of sulphur and along a horizontal line lay out the pounds of green ore—from 0 to 4,000 pounds. Take the 10 per cent. sulphur which we find was raised to 15 per cent. by the addition of 4,000 pounds of green ore, mark the point corresponding to 15 per cent. S above 4,000 pounds of green ore; connect this with the point corresponding to 10 per cent. sulphur with no green ore. This gives a diagonal line along which we can read the sulphur obtained by mixing 12,000 pounds roast ore at 10 per cent. sulphur with any amount of green ore at 30 per cent. sulphur. Connecting the other calculated points we have Fig. 5 completed and can read from it any desired mixture of green and roast ore.

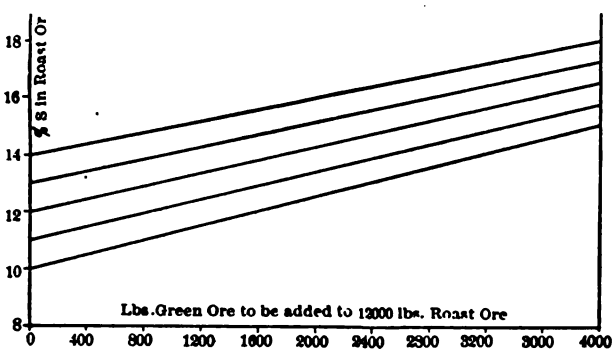


FIG. 5.—CHART FOR FURNACE CHARGE.

The method of charting the work of a furnace from day to day, so as to obtain a graphic record of its consumption and output, and also to obtain a prophetic estimate of its probable tonnage for the current month, is well known, but may bear repetition in this connection. Suppose a furnace smelting about 350 tons of ore and making about 12.3 tons of copper a day. If this furnace continues in blast every hour during the month we would expect 370 tons copper for this month. We lay off a horizontal line of thirty days, and on the thirtieth day erect a perpendicular upon which we mark a point corresponding to 370 tons, which we connect by a diagonal dotted line with the point on the base representing the beginning of the month. We graduate the right-hand vertical in a scale of tons from 0 to 370, and we graduate on the left a vertical column on a scale ten times as great for the daily output in tons. At the top of the left-hand column we lay off a scale of hours from 0 to 24, showing the number of hours the furnace was in blast each day. As we mark in each day's tonnage, we also mark in the total tonnage of copper produced up to date. This total tonnage to date, as long as the furnace produces 12.3 tons a day, will coincide with the dotted line of expected production, but will deviate from this and fall either above or below it, according as the furnace produces more or less than the average amount of copper. Any delay or stoppage of the furnace is shown by the line representing hours in blast, and the cause of any delay may be marked by a circle enclosing a letter or figure referring to the usual causes of delay and explained in the legend. Such a chart from the 1st to the 15th of one month is shown in Fig. 6.

In the same way the output of the mines, the performance of day and night shift, the furnace records, tonnage of ores, flux, coke, analyses of the ore, amount or pressure of air may be tabulated from month to month. By plotting on translucent paper, they can be laid one over the other for comparison, and in this way interesting relations and points of economy may be discovered.

For example, the monthly averages showing copper in the matte and copper in the slag should be parallel; if they are not, a comparison of the silica chart of the slag with the copper in the slag may show the cause of difference. Again, the matte grade and the life of the converter lining should be parallel; but if a better grade of matte in a certain month is not accompanied by an increased duration of lining, the explanation may be found in the analysis chart of the quartz used which may show bad quartz for the month in question.

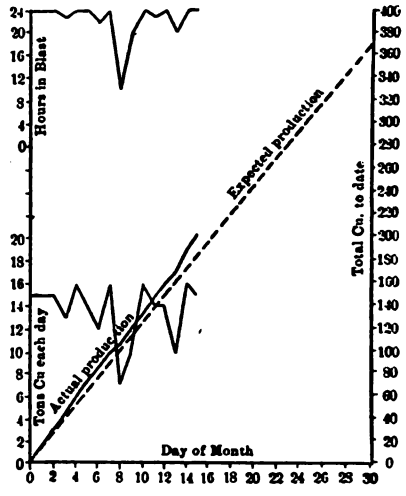

Hours in Blast
Tons Cu each day
Actual production
Expected production
Total Cu. to date
Day of Month
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30

FIG. 6.—FURNACE CHART FOR

Often, also, the continuous relation of two lines may open a field for study. For example, the silica in the ore and the percentage of sulphur in the ore after roasting may be inverse one to the other; which on investigation proves that a certain amount of rock helps the roasting by cracking and swelling and so opening up the ore in the roast beds. This shows, also, the desirability of keeping a certain amount of rock in the ore.

But the output of the furnace per month may also prove to be exactly inverse to the silica in the ore; and this raises the question of volume of slag loss and the metallurgical balance sheet. Frequently by such comparison we see that what is apparently the cheapest method is in reality the most expensive. It might be thought cheaper to leave silicious rock in the ore, than to pick the rock out and afterwards add barren quartz for flux; but a comparison of the slag volumes will show that in many cases this apparent waste is an actual saving of expense.

There is no factor of furnace practice, except perhaps the personal equation, which cannot be studied by the graphic method. Even the personal equation may be referable to some disturbing condition. The number of furnace accidents may be shown to be greater under one foreman than another, or may reach a maximum at certain hours of the day, showing either individual carelessless or improper conditions under which the men are laboring. All knowledge comes by the intelligent comparison of data and the graphic method is the readiest means of making our data intelligible.

Mining Letters from Correspondents

Mines and Mining Wishes to Secure an Actual Reputable Correspondent from the Mining Centers of the World

Denver

Jan. 16.—The banks throughout the state have resumed currency and specie payments, and all branches of business appear to be moving along in good shape. Confidence is not restored because it was not lost, but as the season advances improved conditions are in evidence on every hand. Great enterprises are blocked out for the year and Colorado will witness the expenditure of at least $30,000,000 within her borders during the present year, including railway construction, various public improvements, land purchases, mining and smelting improvements and purchases, urban building operations and scores of other works requiring large sums of money, thousands of common and skilled laborers, putting the state on the broad and substantial basis of enduring and uninterrupted prosperity.

Financial arrangements have been made for pushing the Moffat road along fifty or sixty miles more, from Yarmony to Steamboat Springs, and in all probability it will be extended rapidly on to Salt Lake. Ten or a dozen of Denver's multi-millionaires have shown their faith by their work, and stand ready to contribute their millions to the great enterprise that means so much for Denver, and that rich, great and undeveloped part of the state. We may now look for the rapid development of the resources of Routt county, and in eighteen months that remarkable region will be pouring millions of her coal, metalliferous and other products into the lap of Denver.

The following representative millionaire citizens have stepped forward with their great wealth and will aid Mr. Moffat in pushing his road to the Utah line, where a syndicate of Salt Lake people will step forward and build it on to that rich intermountain city.

The Denver men who have come to Mr. Moffat's aid are David C. Dodge, Henry M. Porter, Lawrence C. Phipps, Thomas W. Walsh, John F. Campion, Charles Boettcher, Charles J. Hughes, Jr., William Byrd Page, Samuel M. Perry, representing an aggregate of thirty or forty million of dollars. They are men, not only of great wealth, but of great enterprise and ability, and we may confidently look for highly profitable results as soon as the road fairly reaches the heart of the vast resources of Routt county.

It is estimated that the coal fields of that section cover an area of 1,000 square miles and the best quality of bituminous, semi-bituminous and anthracite coal is found in that district. Lateral lines will be built from the Moffat road to any and all points in the county where the resources and development will justify.

Steamboat Springs will become a noted place of resort and the Continental Railway Tunnel Company will push its great bore six or seven miles through the spinal column of the continent, and it will soon be seen that Colorado is able to build her own railroads, bore her tunnels, develop her vast resources, make and handle her own money, and establish within her borders such an independent and self-sustaining people as are to be found nowhere else on earth.

A few days ago the secretary of the treasury sent to Congress the plans and specifications of the new federal building for Denver, which is to cost completed and furnished about $2,000,000. The ground embraces approximately 49,500 square feet, and not including nearly a full sized basement will be four stories, fire-proof, built of steel, cement, enameled brick, iron and bronze work, reinforced concrete, tera cotta, granite approaches, marble and mosaic floors, marble columns, and all apartments finished in the latest style of the art, as a great government building standing without a peer in the realm.

G. N. Howell of Portland, Oregon, who has just returned from a trip through Mexico where he has extensive mining interests, speaks highly of the general outlook for that country and the great northtwest of the United States. He passed through Denver on his return and stated that in Portland and other cities of the northwest the clearing house certificates were being retired before he left the United States some two weeks ago. The banks have plenty of money on hand to meet all checks and were resuming cash payments rapidly, retiring the clearing house certificates as fast as presented.

"The financial conditions have largely affected the lumber industry in the United States," said Mr. Howell, "and in many instances the production of lumber and the manufacture of such articles as shingles, etc., has been suspended entirely. The suspension, however, has not been altogether due to the financial depression, but in some measure to the largely increased freight rate states put upon lumber and by-products. This increased rate started the suspensions, and the financial conditions finished the work of cutting off the manufacture of these smaller goods and the sawing of great amounts of lumber."

The lumber supply of the great northwest is by no means exhausted, according to Mr. Howell, who states that this section will afford all the needed lumber to run the mills for the next half century. In the eastern part of the United States it is likely that the supply has been very much depleted, and it is only a question of a very short time before the timber is all gone from the eastern forests. In the northwest, however, there are still many extensive tracts of red cedar and general timber lands, which for many years will furnish the lumbermen of the United States with practically inexhaustible supplies of timber for cutting.

"Conditions in the United States," declared Mr. Howell, "are improving rapidly and business generally shows a greatly improved tone.

"The state holidays which have been declared from day to day in many states of the United States have become a thing of the past in Oregon, and this, with the retirement of the clearing house certificates and the resumption of cash payments, will greatly strengthen the tone of business and facilitate the early resumption of normal conditions all over that section of the country. Next year will naturally show a largely decreased volume of business in the United States, due largely to the fact that it is a presidential year. Of course, the present conditions will have a great deal to do with the decrease in business, but will not altogether be responsible for it."

Mr. Howell stated that while Mexico was pretty thoroughly advertised all over the United States, its timber resources were not placed properly before the timber interests of the world and very little authentic information is abroad with reference to the timber lands of this republic.

The northwest of the United States shipped into Mexico last year a great many railroad ties, which went into the building of railroads in Chihuahua and Sonora. Lack of

transportation facilities and machin ery for the prompt cutting of these ties was probably responsible for this fact, but it should not be necessary for Mexico to import railroad ties with all the undeveloped timber lands within her domains.

Bisbee, Arizona

Jan. 11.—Judging from reports of authentic foundation a concerted effort is being made towards the increase of production in the district. The Calumet & Arizona will produce this month a slight amount in advance of the output of December. The Copper Queen has put into commission at their smelter at Douglas one additional furnace and one converter, and the production of the Superior & Pittsburg will be increased about fifty per cent. more than its December output. With this additional output, more men must be employed, the number at the Copper Queen smelter to be increased fifteen per cent. Among the different properties in the district, nothing of an unusual nature has occurred during the past week except general routine work.

In December the Copper Queen did 5,600 feet of development work, thus giving an idea of the immense amount of work being done by this company in the way of development. The shaft of the Sacramento has reached a distance of 1,170 feet, sinking being continued. Six drifts are being run towards this shaft from various other properties of the company. Two hoists are being used in the shaft, one at the 1,000 level and another lower in the hole, which is used in the sinking operations. At the new power house the four 425 h. p. boilers have been placed and two have been bricked in. One large compressor has already been placed and work on the second is now under way. The 200-foot stack is nearly completed.

The Calumet & Arizona has not done very much new work of an unusual kind, development of new ore bodies being followed mostly. The output for January will be increased to some extent over that of the previous month.

Advices from a reliable source state that the production of the Superior & Pittsburg will be increased in January over that of December about fifty per cent. This will bring the production for the present month to about the highest point on record. At the different mines of the company new ore bodies are being opened almost weekly. The developments on the Hoatson's 1,200 levels are most satisfactory, more ore being opened up daily. Two new finds of sulphides have been made on the 1,200 level this week, which will run from ten to twelve per cent. In sinking the Hoatson has made splendid progress and the back of the 1,300 station has been reached. The station will be begun on about the 15th of the coming month. The Cole is cutting their 1,400 station at present and the Junction its 1,300. Some fine sulphides are being raised from drifts Nos. 7 and 31 on the 1,200 level of the latter property and are being shipped to the C. & A. smelter at Douglas.

The Shattuck-Arizona is still engaged in the development and exploration work, about twenty-five men being employed at this work. The resignation of B. M. Pattison, who has been superintendent of this company, as well as the Denn-Arizona, controlled by the same stockholders, since the beginning of operations at the properties, has been confirmed by Mr. Pattison when seen by a representative of this publication on his return from New Mexico. Mr. Pattison also stated that he will remain in Bisbee to look after the interests of his father and himself in both this district, New Mexico and Old Mexico. His resignation has been presented and accepted, to take effect directly after the annual meeting of the stockholders which will be held the middle of February. It is rumored that S. A. Parnell, formerly general manager of the Calumet & Arizona interests, will be Mr. Pattison's successor, but it has not been confirmed up to the present writing. Directly after the stockholders' meeting, it is understood, those in control, who are the Hill, Bardon and Chisholm interests, will pay a visit to the property of the company. The erection of the smelter contemplated will then be settled. The Hill interests secured control of the companies some months ago. A visit will be made to the smelter site near Douglas which has been chosen, and it is possible that the work of erecting the plant will begin soon afterwards.

The tunnel of the Butte & Arizona property in the Huachuca mountains, thirty-five miles from Bisbee, has been cut a distance of 2,000 feet to date. About 100 feet more must be cut before the contact is reached, at which point the extent of the ore body will be determined. At the head of the tunnel a depth of 1,100 feet has been attained from the ore on the surface, and the same ore has ben encountered at this depth. The ore is mostly glance and gray copper, running fairly high in values.

Dr. L. D. Ricketts, general manager of the Greene-Cananea was in Bisbee this week on his way to Cananea from the East. When seen by correspondent for this publication, he stated that no date has yet been set for the resumption of production by his company. The development work at the Cananea-Duluth ground has been highly satisfactory and has shown that portion of th ecompany's holdings to be very rich.

The annual meeting of the Cadena de Cobre Mining Company was held in Bisbee on January 6th. No business of importance was transacted on account of the books of the company being held by the court, the result of the law suit. The present officers remain in power.

The Phoenix Republican states that President I. T. Hosey and Engineer Dobbins, of the Arizona Placer Mining Company accompanied by J. H. Heward, left yesterday morning for the company's placer fields on the Hassayampa. Messrs Hosey and Dobbins are provided with sluicing apparatus prepared to do the necessary testing and representation work on the property of the company. They will secure a large number of men at Wickenburg. Mr. Heward will remain on the ground several days making thorough tests with a view to connecting himself with the dredging operations of the company. At the completion of his investigation the values of every part of the ground will have been pretty accurately determined.

It is stated by representatives of the company that within a year one of the largest dredges in operation in the territory will be installed on that part of the Hassayampa covered by the claims of the company.

As near as can be figured up at this writing the copper output of Arizona for 1907 amounted in round numbers to 260,250,000 pounds, giving the territory first place among the copper producing states of the world. This is not due to any increase in its production, however, but is the result of the falling off of 120,000,000 pounds in the production in Butte.

The estimates in the production of copper on the American continent in 1907, compared with 1906, are as follows (in pounds):

	1907	1906
Arizona	260,250,000	284,000,000
Montana	240,000,000	250,000,000
Michigan	230,000,000	228,000,000
Utah	98,750,000	60,000,000
California	21,000,000	15,000,000
Other states	15,000,000	35,000,000
Mexico & Can	150,000,000	200,000,000
Total prod't'n	1,015,000,000	1,072,000,000

We figure the production of Arizona in 1907, by camps and companies as follows:

Camp. Mine.	1907	1906
Bisbee—Copper Queen	88,000,000	96,481,904
Bisbee—Calumet & Arizona	39,550,000	47,164,000
Clifton—Arizona Copper Co.	27,000,000	25,960,000
Shannon Co.	14,200,000	11,964,000
Morenci—Detroit Co.	15,000,000	16,906,000
Globe—Old Dominion	36,000,000	34,400,000
Jerome—United Verde	33,000,000	38,000,000
Miscellaneous	7,500,000	10,000,000
Total	260,250,000	280,875,904

The above totals in each year include a certain amount of Nacazari and Greene Consolidated production treated by the Copper Queen and Old Dominion in the form of concentrates and used for fluxing purposes.

Had it not been for the unsettled copper situation, which necessitated restriction of the 1907 output of copper in the territory, Arizona would undoubtedly have reached the 300,000,000 pound mark, whereas production fell off 24,000,000 pounds.

Ashland, Oregon

Jan. 11.—Recently W. G. Yarworth Jones of London, England, arrived in Ashland on important mining business. In company with C. W. Evans he soon left on a trip of inspection to the Buzzard gold mine, where J. T. McLean, the mining and mechanical engineer of New York City, in company with Peter Applegate of Jacksonville, have been for the past thirty days installing a crushing and concentrating plant, which was put in commission last month. The Buzzard mine is fast proving to be an extraordinarily rich gold property. From conservative estimates it is considered there is fully two hundred million tons of material on the property that will net $5 per ton gold, and all of which can be mined by steam shovel and conveyed to the crushing plant by gravity, with plenty of timber and water for all purposes on the ground.

Acting upon their own motion, Railroad Commissioners T. K. Campbell and Oswald West have filed charges of inadequate passenger service against the Southern Pacific and ordered that a hearing be had before the commission. The details will be fixed after the railroad has filed its answer.

The complaint sets forth that the commission has investigated the passenger service and finds that there are sufficient grounds to warrant a hearing to determine whether such service is unreasonable and inadequate.

The commission recites that only two passenger trains are run south from Roseburg, these being scheduled at two hours and fifty minutes apart at Roseburg and two hours and fifteen minutes apart at Ashland. The latter train makes but three stops between these two points, thereby restricting patronage at most stations to one south bound train each day.

The Southern Pacific freight trains southward through here have been swarming with men for weeks past since the financial flurry stopped railroad construction work and curtailed so many industries, throwing thousands of men out of employment. Many of them are doubtless genuine workingmen but a large following of professional hoboes have joined the migration. The problem of handling them at Ashland, which is a railroad division point where all freight trains are made up for the haul across the Siskiyous into California, is quite a serious one for the police authorities, to whom frequent complaint of the terrorization of certain sections of the city by these "hobo" gangs have been made. "Herding" of them while making the stop here and passing them on south has been one of the regular details of the city police ever since the rush began a few weeks ago. The railroad company has kept a special officer at Ashland to protect its trains and property but the flight continues and it is not unusual for from fifty to one hundred to pass south on the freights in one day, who practically force their passage.

At Tacoma today the State Federation of Labor unanimously voted to put the Alaska-Yukon Pacific exposition in Seattle on the unfair list, the committee sent to Seattle yesterday to confer with the exposition officers having failed in its mission. A convention hall story is that the exposition officials desired the federation to take this action in order to have a club over the heads of contractors who, it is said, are responsible for the "open shop" at the fair grounds.

Butte, Montana

Jan. 10.—Last week thirty-seven stockholders of the Kimberly-Montana Mining Company filed answer in the federal court to the petition of the Montana Consolidated Mining Company that the Kimberly company be adjudged bankrupt. The stockholders represent 450,000 shares of stock and allege that the proceeds were brought "for the express purpose of unlawfully and fraudulently imposing upon and using this court to assist in carrying out a fraud upon a large body of stockholders and to cheat them out of their just rights."

The answer states the Kimberly company has assets of $1,000,000 and that its just liabilities are not more than one-third that sum. It is alleged that the Montana Consolidated Company was incorporated under the laws of Arizona for the purpose of defrauding many of the stockholders of the Kimberly company; that Henry M. Ryan, general manager of the Kimberly company, dictates the policy of both the companies, and that the Montana company is violating an injunction of the Illinois court in attempting to have the Kimberly company declared bankrupt.

It is asked that the petition be dismissed.

It was announced at Helena the first of the month that the American Smelting and Refining Company will soon close down a number of its smelting plants because of the depression in the lead market. At the East Helena plant the company reduced its force 100 men and posted notices of a reduction in wages of the 250 who are retained of ten per cent.

Manager Frank M. Smith of the Helena smelter said that the information that the company was about to close the local plant was received by him several days ago, and that he urged for a continuance of operations on a limited basis and a return to the old wage scale. This action was taken with the understanding, he says, that the smelting plants in Colorado and other states would be closed.

Senator W. A. Clark, one of the most noted copper authorities in the world stated a short time ago that the price of copper would go to sixteen cents in sixty days, the mines will soon resume their normal output, and all other industries will become as active in six months as before the financial disturbances.

"There should be no fears entertained regarding the future progress and industrial prosperity of the American people." Other eminent mining and smelter men, such as the Guggenheims, speak in the same optimistic terms, and their predictions are certainly based upon knowledge that the average man does not possess. New smelters are being erected and old ones enlarged, indicating that ample preparations are being made to handle a constantly increasing tonnage of ore from Montana, Idaho, Utah and Nevada. The Guggenheims operate more smelters than any other combination of men in the world, and when they prepare to handle a greater production of precious metal ores it is a safe bet that the future stability of the copper, lead and silver market is assured. These men insinuate that the consumption of

silver is going to increase and that the price of the white metal will advance. The fact is the prevailing financial stringency and demand for currency reform is operating to give silver a support and popularity it has not had for the past ten years, and this means its ultimate restoration as legal tender money. This belief has recently been expressed by a number of American statesmen and other eminent students of the currency question.

All signs indicate an early advance in the price of copper and resumption of operations by practically all of the big mines producing that metal. The surplus stock of copper is being rapidly exhausted, and the only fear is that within a few months the supply will be so regulated that the demand will advance the price beyond the point that most consumers will consider exorbitant, as was the case when the price went to twenty-five cents a pound and remained at that unreasonable figure until consumers rebelled and refused to buy only in very small quantity. However, Senator Clark and other big leading copper mine operators have indicated by recent utterances that those who control about ninety-five per cent. of the production will maintain the price at about sixteen cents—a price that will be fair to consumers and that will afford profitable operation of all copper mines. Such an equitable price will give the industry permanent stability—the one thing most needed.

The assured immediate improvement in the copper situation means the starting of the Snowstorm mine and mill at an early date, say about the middle of January—an event that will be especially appreciated by the merchants and miners of Mullan, whose trade and employment largely depend on the big copper bonanza.

Word reached here today from Helena that the Great Northern Railway Company had purchased the Montana Central for a consideration of $6,135,454. A deed was filed yesterday in the office of the clerk and recorder of Lewis and Clark county. The Montana Central line runs from Great Falls to Butte and has been controlled by the Great Northern for a number of years.

Master in Chancery Crane filed findings in the famous Deer Lodge valley smoke case in the Federal Court today, and if approved by Judge Hunt it is not likely that a permanent injunction asked for by the farmers residing close to the $5,000,000 Washoe smelter at Anaconda will be granted. Besides the significant views expressed by the master in his appended statement, an important feature is the manner in which the findings relating to the effect of arsenic upon the animals in the alleged smoke zone have been amended.

The original finding now is made to state that no deaths were found to have occurred from arsenical poisoning; it is held that sickness only resulted. It was on the allegation that deaths of animals had occurred from such poisoning that the request for a permanent injunction was largely based.

New York City

Jan. 11.—It was stated a few days ago, that the Union Pacific directors have, in common with directors of other roads owning and operating coal mines, been discussing the question of segregating the coal and transportation departments in accordance with the provisions of the rate law which was enacted last year.

The provisions of this law will prohibit them on and after May 1st, from transporting any article or commodity other than timber, manufactured or produced by them. The interpretation given the laws by the attorneys for the Union Pacific is that the company may produce and transport its own coal for its own use in transportation or otherwise, but shall not sell such coal (from its own mines) before or after it has been transported. In accordance with this interpretation of the law, it is planned by the Union Pacific to keep its coal mines for its own exclusive use.

They will be operated sufficiently to supply the Union Pacific system whenever the coal of the mines can be delivered cheaper than from other sections, but consumers, even in the company's district, will be compelled to buy their supplies elsewhere, which means, the directors believe, that the Union Pacific will receive a large and profitable haul on new traffic.

The Union Pacific Coal Company is owned almost exclusively by the Union Pacific Railroad Company. Its entire capital stock of $5,000,000 is so owned. The coal company has $5,000,000 outstanding in 5 per cent. bonds, of which $628,000 only are in the hands of the public, the remaining $4,372,000 being in the Union Pacific treasury.

The commission of bankers appointed by Governor Hughes during the monetary panic to recommend modifications of New York's banking laws, reported to the governor a measure which will tend to view that in New York City, state banks should maintain the same cash reserve as national banks, namely twenty-five per cent. and that trust companies should maintain also twenty-five per cent. reserve. Necessarily in all cases, in their own vaults. A strong presentment was made against the practice of promoters obtaining control of a chain of banks to further their own ends. The report says that as New York is the financial and commercial center of the country its cash bank reserves must not become unimpaired. This commission recommends that the state superintendent of banks be empowered to veto the establishment of a bank or trust company or branch or the purchase of control of one banking institution by another. The commission believed that banks in New York "should not hereafter be permitted to have branches unless they possess a capital of $5,000,000, and we think that banks and trust companies should be compelled to furnish an additional $100,000 capital for each branch opened.

"In general, the commission would increase and make more direct and intimate the supervisory control of the state superintendent over all moneyed institutions in the matter of investments and loans and commissions. It recommends that it be made compulsory that a list of discounts of all commercial paper should be read to the directory or submitted in a written form at a meeting next succeeding the making of the same and any intentional scheme in the making of any such loans should be made a misdemeanor." The law should prevent the interchange of depositors by which depositors or directors loan directly to themselves or are enabled to control a chain of banks.

The reports point out that the capital stock of all the banks and trust companies doing business in the state amounts in round numbers to $263,000,000 and that the market value thereof is several times larger. The commission says that "It would be invidious and unjust discrimination against banking investments to prohibit the use of such stock as collateral for loans." It is suggested that loans upon such stock be limited to ten per cent. of the capital of the corporation whose stock is offered as collateral.

Multi-millionaire, W. A. Clark, former United States Senator, and owner of some of the richest copper mines in the world, railroads and other vast holdings, had his palatial office furniture attached last week to satisfy a judgment of $44,894, which Mining Expert George Treadwell obtained against him.

If Mr. Treadwell's representatives

could have done so, they would have seized the $5,000,000 palace owned by Senator Clark, at Fifth avenue and Seventy-ninth street. But when they would have laid hands on that, they found it has been incorporated, with all its contents, into the W. A. Clark Realty Company and had thus been protected. Deputy sheriffs are awaiting a chance to seize the rich art collection of paintings which the Montana magnate has stored in his apartments at No. 175 West Fifty-eighth street.

The $44,000 judgment, which brought on all the turmoil, dates back eight years to the day that, Treadwell claims, he discovered the $300,000,000 United Verde in Arizona. Treadwell says he was paid for his prospecting by the owners, and presented with 100 shares of the company's stock. At that time the stock was quoted at $10. A little later, being cramped for cash in London, Treadwell hypothecated the hundred shares.

Then Senator Clark stepped into the situation. He knew that there were hundreds of millions of precious metals in the United Verde. Even then the shares had risen from $10 to $300. But Treadwell says the Senator re-organized the company and froze him out completely. For eight years he fought for it. Finally on Monday, Judge Davis handed down an opinion in which he declared that the copper king must turn over his stock with interest to pay the penalty.

Dunn's report for 1907 gives out the following in relation to the business failures in the eWst. "Fewer failures being reported by Iowa, Nebraska, Kansas, Indian territory, Oklahoma, Colorado, North Dakota, South Dakota and Wyoming. The only states in this section reporting more failures than last year were Minnesota, with an increase of two, and New Mexico with an increase of three. The net results for the section was a decrease of eighty-seven in number. In no case was there any important increase in amount of liabilities, although unfavorable comparisons were made by Nebraska, Oklahoma, Montana, North Dakota and New Mexico. Liabilities decreased $700,000 in Minnesota, and smaller amounts in Iowa, Kansas, South Dakota, Colorado and Wyoming. This section reported the smallest liabilities for any year since 1900, and failures were fewer in number than in any year since 1901. It shared in the banking disturbances, however, the number of suspensions being double those of the previous year, and liabilities about $8,000,000 larger."

Deadwood, South Dakota

Jan. 13. Mining and other branches of business have shown some revival since the beginning of the year. The financial whirlwind did not hit us very hard in the Black Hills. We were pretty well sheltered from the storm and our people kept right on about their own business as if nothing had happened. As is customary, we reduce forces and operations to some extent in the winter season, but that is the case in about all mining districts. However, several hitherto idle properties are being put in shape for active operations, and forces increased on others as fast as good miners can be obtained.

The great Homestake and its allied properties are booming along at about their general pace and the other large mines are working their usual winter forces. With us money is plenty, and it circulates as freely as it did before the so-called panic. Our banks did not even feel a tremor of the shock that shook up things on the outside.

Operations have been resumed on the Saginaw Mining and Milling Company's properties, near Custer, which had been idle sevaral weeks, occasioned by the September fire that did serious damage. New buildings have been put up, additional machinery installed and other valuable improvements made. The new building for the hoisting plant has been equipped with a Hendrie & Bolthoff 9x10 hoist, with a speed of 400 revolutions a minute and a Browning six-kilowat electric dynamo, with capacity to light the hoisting plant, mill, mines and buildings. Various other improvements have been made and the property is now one of the best equipped in that part of the state. The management completed the unwatering of the mines about two weeks ago, and now everything is in good shape for steady work.

The Rochford-Wyoming Oil Company is pushing operations with quite a force and the indications are encouraging as far as the work has progressed. In well No. 1, sunk last fall to a depth of 400 feet, the oil sand was found to be quite rich and of a good lubricating quality.

The work was then transferred to well No. 2, in which the oil sand was struck at a depth of 200 feet, where oil of the same quality as in No. 1 was found. It was a highly satisfactory result, but it is proposed to go down with a No. 3 well to a depth of 300 or 400 feet to see what per cent. of oil the sand contains in that stratum.

The company is confident of finding oil in paying quantities, and other oil men are looking over the South Dakota fields with the view of securing lands and prospecting for oil.

Tonopah, Nevada

Jan. 12.—Mining operations were not as severely hampered by the labor troubles, the money stringency and other reserves here as in Goldfield and some of the other Nevada camps. As a rule, however, business is beginning to show improvement all over the state, and much speculation is indulged in as to what the special legislature will do which convenes in Carson Tuesday, the 14th inst. Already the clans are at the capital and a red hot time is anticipated, but the level-headed are confident that no serious results will follow. There are enough conservative, clear-headed and strong men present to hold the fire-eaters and other discordant elements in check, and make the session one of peace and profit to the state. We do not object to miners' unions of a local character, but we do object to the Western Federation of Miners, or any other organization that has no business here but to stir up strife and breed anarchy.

The Western Federation of Miners is a thing of the past, as far as Nevada is concerned, and, as a rule, the miners themselves have no use for it. A desperate effort is being made by its leaders to keep it alive, but it will die the death of the wicked and go where the woodbine twineth.

They have a good joke on ex-Senator William M. Stewart of this state, who was in Bullfrog during Christmas. The senator is hale and hearty at the age of about eighty-five, and he wears heavy snow-white whiskers that hang down to his waist. He is six feet three, weighs 236 pounds and in his younger days was a physical and mental giant. A Boston paper says he was one time walking leisurally down F. street in the shopping district, when the manager of the toy department of one of the large stores rushed up and accosted him as follows:

"Excuse me," said the toy man, "I don't want to offend you, but if you will come up to my store and play Santa Claus in the toy department until Christmas Eve we'll pay you $50 a week. All you will have to do will be to dress up in a fancy costume, put a pack of toys on your back and sit upon a platform for the people to look at you."

"My friend," said the old pioneer and statesman, who has just made another fortune, "I've been playing Santa Claus to the children for three-quarters of a century, but I never got anything for

it—it always cost me money. Sorry I can't accept your offer, but I'm glad that an old man like me is worth $50 a week."

For eighteen years Senator Stewart was one of the most distinguished members in the United States Senate, and was a great silver champion as long as there was any hope for that metal.

The Rhyolite Herald says Charles A. Towne, the former silver-tongued orator of Minnesota, has been out in Death Valley where he owns valuable mining interests.

Though first elected to Congress as a Republican, he took the silver side of the money question, and won a national reputation in his fight for bimetalism. He was elected to the Senate from Minnesota and later moved to New York, from which state he was again sent to Congress on the Democratic ticket. In 1900 he was nominated for president on the Silver Republican and Populist tickets, but refused to make the run and supported Bryan.

Mr. Towne is still in favor of free silver, but says, "I am a miner now and down there in Death Valley, where I own some ground, some of the biggest mines in the world will be developed. The awful grandeur of the valley will be a memory to me as long as I live. The clearness of the atmosphere, the magnificent distances and the quietness, as well as the ruggedness, of the country, give one such a strange and new viewpoint of God's handiwork as no pen can describe."

At Carson today the United States Circuit Court took up the injunction case against the Miners' union at Goldefild, asked for by the Mine Owners' association. Affidavits covering many pages were presented and read to the court by the attorney for the operators.

All tended to show that the Miners' union had been the prime factor in all the labor troubles of the camp since its discovery. The union was accused of countenancing the action of the "high graders" and protecting them by their fight against the change room system that was adopted by the operators for the protection of their high grade ores.

The case will be resumed Monday, and probably a decision rendered.

The Tonopah and Goldfield miners, whose ores have been refused by the Salt Lake smelters are to find a new avenue of relief through the Tonopah & Tidewater railroad, which has decided to establish special commodity rates for ore from Goldfield and Tonopah to Denver and Pueblo, Colorado, and Jerome, Arizona.

Probably 300 miners went to work in the mines at Goldfield today and the greater portion of them were former Western Federation men. All of the active mining district is picketed by hundreds of federation miners who swarm the hills in droves attempting to influence the miners to quit work. The miners have to run a gauntlet nearly half a mile long to get to the quarters provided by the mine owners, but so far few have seceded.

It is expected the extra session of the legislature the coming week at Carson will settle the trouble without further disturbance. Only a few of the federation leaders and agitators remain. When they are gone operations will become normal without delay.

Wallace, Idaho

Jan. 10.—Idaho has kept her pace in the march of progress during 1907 in good shape.

The great lead-silver region of the Coeur d'Alenes maintained a splendid record. Its ore values approximated $19,500,000 gross, and dividends paid amounted to $5,664,500. A statement made by Mines and Metals claims that the district makes quite as good a record as in 1906. Contrasting the district with the other famous mining regions the record made by local mines for last year is remarkable, for the reason that their output equaled that of 1906, whereas the production of Butte and other famous camps suffered a reduction in output of from twenty to thirty per cent. with a corresponding lessening of net earnings. The discrimination favoring the Coeur d'Alenes district is due to the excellent fluxing quality of its ores which are always desired by Pacific coast reduction works as well as smelters far to the east.

The tons of high grade crude ore and concentrates shipped from local mines during 1907 total 343,000, the shipments for December estimated, as complete returns for the month from smelters will not be received until about the first of February. The production by months was:

January	22,852
February	22,507
March	41,170
April	32,226
May	36,523
June	35,975
July	31,694
August	31,300
September	27,688
October	26,190
November	18,669
December (estimated)	16,206
Total for year	343,000

The above figures are official, barring the estimate for the month of December, and show, the exact tonnage of ore shipped from the district during the year, which, according to local railway officials, will "about equal the ore shipments for 1906, or within a thousand or two tons."

During the whole of 1906 Coeur d'Alene mines were worked to their full capacity, owing to the excellent price of lead and a fair quotation for silver, their chief by-product, and they were also worked to their utmost limit for the first eight months of 1907 for similar reason, lead ruling at a higher price (6 cents) for the first four months of the year than for any similar period of time during the last twenty-five years; silver also ruled around sixty-eight cents an ounce, whereas for the full year the price averaged but sixty-five cents. Had not the slump in metal prices occurred early in September, local mines would have shown a considerable tonnage increase over that for 1906. The slump had the effect of reducing production during the last two months of the year, the Morning lead-silver mine closing down November 20th, and the Snowstorm copper mine suspending production a few days later—two of the largest tonnage producers in the district.

The New York price of lead for 1907 averaged five cents a pound and silver for the full year sixty-five cents an ounce, which is a slight decline from the prices of these metals for the previous year.

The increase in both output and net earnings of Coeur d'Alene mines (principally lead and silver) since 1901 has been truly remarkable, as the following will show:

	Gross Value	Net Profit
1902	$ 8,124,337	$1,460,791
1903	10,064,218	2,162,416
1904	11,200,178	2,950,807
1905	13,600,948	4,525,436
1906	20,500,000	5,660,000
1907	19,613,850	5,664,500

From the above figures the reader will learn that for the six year period Coeur d'Alene mines yielded ore of total gross value of more than $80,000,000, and earned net profits of more than $20,000,000, equivalent to annual net earnings of twenty-five per cent.—a rate of interest twelve times greater than is received by holders of government bonds. It should be borne in mind also that the dividends distributions for the six year period does not represent all of the actual net earnings for the reason that the better equipment of mines and the enlargement of properties by acquiring additional ground absorbed a vast amount of money—perhaps $2,000,000, which added just that much more to the in-

trinsic value of the mines thus improved and bettered.

The divident earnings of local mines for last year, in the face of four months of financial panic, must be considered remarkable by all fair-minded people. The Bunker Hill & Sullivan company led by disbursing dividends of $1,980,000; the Federal company coming second, with $1,710,000; the Hercules company, third, with (estimated) $1,000,000, and the Hecla company fourth, with $520,000. It is said that the Bunker Hill company's dividend is the second largest dividend disbursement during 1907 by any mining company in the United States. It is also worthy of remark that the Bunker Hill is the largest and most valuable lead-silver mine in the world, its production exceeding that of any other agentiferous mine.

The value of Coeur d'Alene lead-silver ores and concentrates shipped to the smiters during 1907, gauged by New York prices, averaged $64.95 per ton, while the Snowstorm copper-silver ores averaged $20 per ton, shipped direct from the mine without concentration, barring a few shipments of the leahcing mill product of higher values which, for convenience, is included in the shipments of crude ore. The Monarch, a new copper mine, also made a number of shipments of copper-gold ore that netted handsome profits, but these are included in the dividend table under the head of "Profits of Gold Mines and Leasers."

As shown above the total shipments for the year was 343,000 tons, 283,000 tons being the output of the lead-silver of the Snowstorm mine. The lead content of the 283,000 tons of argentiferous ore approximate fifty per cent. of its entire weight, thus giving 141,500 tons of metallic lead, which valued at five cents per pound, gives total value of $14,150,000. The silver content of this ore average about twenty-three ounces per ton, thus giving total of 6,509,000 ounces of aggregate value (figured at sixty-five cents) of $4,230,850. Therefore, the total value of the lead and silver content of the 283,000 tons of argentiferous ore is $18,380,850.

The 60,000 tons of ore produced by the Snowstorm mine had an average copper content of four per cent., carrying about seven ounces of silver per ton. Thus estimated, the Snowstorm mine for 1907 produced 4,800,000 pounds of copper having a total value of (figured at twenty cents a pound) $960,000, and $420,000 ounces of silver of total value of $273,000. Add the value of the Snowstorm's output to that of the lead-silver mines of the district and the grand total for 1907 is $19,613,850.

The dividends paid by companies in 1907 were:

Bunker Hill & Sullivan Co.	$1,980,000
Federal Mining & Smelting Co	1,710,000
Hercules Mining Co. (Est.)	1,000,000
Hecla Mining Co.	520,000
Snowstorm Mining Co.	360,000
Success Mining Co.	60,000
Monitor Mining Co.	9,500
Profits of gold mines and leasers (estimated)	25,000
Total.	$5,664,500

The increase in value of Coeur d'Alene mines for 1907 may be conservatively estimated to have been $12,000,000, this representing the enlargement of ore reserves in the producing mines and the discovery of important ore bodies in new properties yet to enter upon a shipping career. The famous Bunker Hill mine added to its former intrinsic value at least $3,000,000 by greatly enlarging its already immense ore reserves. In the same manner the Hecla increased in value $1,000,000; the Hunter a like amount; the Success, $500,000; the Stewart, $500,000; the Tamarack & Chesapeak, $500,000; the Rex, $500,000; the Monarch, $500,000, and the Surprise, $250,000, these increases totaling $9,250,000. A number of partially developed lead-silver properties made excellent advance by reason of important ore disclosures, notably, the National, the Callahan, the Vienna International, the Imperial, the Arlington, the Chicago-London, the Great Western, the Hennessy-Burns, the Bryan, the Idora, the Alhambra, the Hornsilver, and the Amazon-Manhattan. It is safe to say that some of these properties, with adequate development, will become large producers, ranging in value from $1,000,000 to $5,000,000.

Until the financial stringency occurred there was general development of a score of new copper properties, important ore strikes having been made on the Lucky Calumet, Bullion and Copper Age. Good ore disclosures were also made on a number of other properties in the copper belt. The increased value of the many new mines by reason of important ore strikes added to the value of the district's mining industry for the year not less than $12,000,000. These facts, together with the dividend record of local mines, merit the especial consideration of the alert, intelligent mine investor.

Any arsenic in ores being treated by cyanide process will be precipitated in the zinc precipitation boxes. Precipitates from such boxes must be removed with much care, as the arsenurated hydrogen evolved is poisonous.

Method of Treating Belts

In mills and any kind of work where transmission of power is largely by belts, efficiency is a considerable factor, and good belt service is necessary.

Two things are necessary for perfect belt service. First: pliable, healthy, vigorous belts, waterproof and clean, able and ready to work; second: the prevention of slip.

There have been two ways of stopping slip. One by tension (tight belts) and the other by putting on some sticky matrial. The first way loads the belt, bearings, shafting and engine with a great dead drag of friction load. It is a wasteful way.

The second way hurts the belts, dries them out, uses up power to rip the belt off the pulley and often forms lumps, on top of which the belt rides, with loss of contact and breaking the suction of belt on pulley. Also a wasteful way.

Both these methods are poor. Recently many manufacturers have begun to use a new system of belt-treating. A preparation is put on the surfact of the belt which renders it more efficient. This preparation is fed slowly to the belt and it penetrates into the body of the belt itself, the pulleys force it in, the pores suck it in. It fills and surrounds every tiny fiber, inside and out, with its clean, neutral lubricating food; so that these fibers work with their neighbors in little preservative, frictionless bearings—not the usual rubbing of dry fiber on fiber (and it does the same for ropes as for belts.) It gives a vigorous, pliable, healthy belt, and it prevents all slip. These two conditions are the foundation of good belt service. Their lack is the cause of all trouble.

The result of this treatment is that belts can be run slack without danger of slipping, thereby greatly increasing their efficiency. High tension is wasteful of power and hard on the belt, but untreated belts must be run under high tension or they will slip. The preparation which is used to obtain these results is described in a booklet entitled "The Treatment of Belts and Ropes for Service and Profit," which is issued by the Cling-Surface Company, Buffalo, New York.

Iridium occurs with platinum and other metals in the platinum ores, but most commonly as osmiridium. Iridium is much like platinum, but is brittle, fuses with great difficulty and has a specific gravity of 22.4. It is not soluble in any acid, not even in aqua regia, by which it may be distinguished from gold and platinum.

Movements in Mining Camps of World

Only Authenticated Reports Will Be Admitted to These Columns

ARIZONA

Cochise County.—A negotiation for the sale or lease of its property is being carried on by the Transvaal Copper Company of Douglas with the Nicholas Copper Company.—The Savage Gold and Copper Company in the Paradise district is building a new road for the hauling of ore and machinery to the depot.—At the same time the new vertical shaft on the Snowball claim is, with the aid of machinery, being sunk, ore will be shipped to the Copper Queen smelter at Douglas.—The Bisbee-Sonora Development Company in the Chiricahua district is employing fourteen men to drive a tunnel at present advanced 170 feet to cut in twenty or thirty feet a ledge from which the company has taken three carloads of $40 ore on the surface where it is sixty feet wide. There are thirty claims in this property and the ledge runs 7,200 feet through the entire group of claims.—During the month of December 5,600 feet of development work were done in the Copper Queen property. Sinking is going on in the Sacramento, the bottom of the shaft now being at the 1,160-foot mark. Two hoists are being utilized in the shaft, one at the 1,000 level, which is used to hoist men and tools and one lower down, which is used in the sinking operations.—At the Briggs shaft of the Superior & Pittsburg a very promising condition has recently been disclosed. Ore of excellent grade has been run into, and the management is more than ever satisfied that this will eventually be a very important portion of their possessions.

Mohave County.—Water in large quantities and also an excellent grade of ore showing much gold in the horn has been encountered by A. W. Bratland on his property in the Silver Creek section where he is now installing a hoisting plant.—Judge N. M. Richardson and son, operating the C. K. mine in the Union Pass section recently encountered a six-foot body of ore running $30 in gold to the ton, some streak running $100 to the ton.—E. G. Straub of Denver, who is promoting a group of gold claims in the Wickenberg country, has interested New York and Philadelphia money in the proposition and actual operations on the properties have begun. The deal is inclusive of Judge Wren's group and Frank Straub of Denver, W. J. Dilthey of New York, and C. L. Dilthey of Philadelphia are on the ground to suprintend the work.—The big stamp mill at the Victor mine is pounding away on good mill ore and a high percentage of recovery is being made on the plates.—The big hoister of the Palo Verde Mining Company has been put in place on the shaft of the old McCracken mine.—Two immense dynamos were received lately by the Desert Power and Water Company from the Western Electric Company, of Chicago. They are of 750 horse-power capacity each and can run up to carry the whole load of 1,500 horse-power whenever necessary.—A patent has been issued to E. F. Thompson on the Rural mine, at Mineral Park.—It is reported from the Sloan well near the line of Arizona, twelve miles southeast of Virgin City, that a big flow of gas was encountered at a depth of about 1,300 feet and that some oil was showing in the hole.—A carload of rich zinc concentrates was shipped from the Tennessee mill. Another static separator will be added to the machines now in the mill for the purpose of grading up the fines and coarse pulps.—Only a few men are now at work on the Banner mines under Superintendent Cohenour, but it is expected that this force will be added to before the first of the coming month.

Pima County.—On the Plumed Knight group of fourteen claims, eighteen miles from Tucson, a new hoist has been installed and everything placed in condition for active operation.—Judge Campbell of Tucson has handed down a decision in favor of the Paine Webber company of New York in the sum of $272,299.04 against the Copper Belle Mining Company of Arizona. This is about $13,000 less than the amount asked.

Yavapai County.—The Leontina Consolidated Mining Company, of which Meredith E. Lawson is president and owner of a large block of stock, has purchased the Revenue group of eight claims in the Big Bug district. The company is financed to carry out the extensive plan of development agreed upon by the directors, which includes the sinking of the shaft to a depth of 600 feet and the exploration of the great dyke by several hundred feet of drift and crosscuts. Drifts will be run from each 100-foot level as the shaft is sunk, commencing at the 200-foot level.—From one drift on the 240-foot level a shaft on the First Home group of the Merchants Mining Company in the Big Bug district, eight tons were taken last week, sampling fifty per cent. lead, twenty ounces in silver and $20 in gold, besides several tons of lower grade ores.—Eight tons of ore from the Mirably mine in the Groom creek district treated in the Gold Basin mill, a short distance from the mine resulted in a $250 gold bar. The mine is being worked under bond and lease by John Hanson who in the last two months has driven a tunnel 450 feet with a small force of miners, uncovering a vein from two to four feet in thickness of the grade of the ore treated.—Dan B. Genung has uncovered in an old shaft, abandoned twenty-five years ago, a streak from three to four feet in width and carrying high values.—Hon. I. T. Stoddard will expend $300,000 in development and improvement on the Binghampton mine, owned by the Stoddard Mines Company near Humboldt. In addition to new and heavier hoisting apparatus which have been ordered and will be installed within six months, a 500-ton smelter will be erected and in operation inside of a year. A new town of Stoddard is also to be built two and a half miles above the present Stoddard smelter.—Agents of the Copper Creek Development Company have filed affidavits of assessment work on 126 mining claims in the Eureka district. The work represents an outlay of at least $12,600. In addition to these claims the company holds by right of location and purchase a large number of other claims, acquired in the last year, covering, according to a conservative estimate, a stretch of mountain and mesa country almost six miles in length and four miles in width.

Yuma County—Samples from a new strike fifteen feet in width at Kofa, are said to run as high as $1,500 to the ton in wire gold.—The original locators who bonded the Amavisca strike to the Mayhew Free Milling Gold Company, financed by Pasadena and Los Angeles parties, are said to have settled with those who recently took it over by accepting $11,000 cash and the balance in stock. The property has been proven a distance of 1,000 feet by ditching along the surface outcroppings for that distance. Assays from the trenches thus made give returns of from $13.20 to $41.00 a ton in gold.

CALIFORNIA

Inyo County.—The Bishop Creek Gold Company is diamond-drilling a third hole on the Rocky Point claim. A depth of 150 feet has been attained from the face of the main tunnel. Preparations are being made to continue work extensively through the winter.

Madera County.—Samples of ore from the new district of Shadow mountain on the Tonopah and Tidewater railroad assay from $15 to $65 a ton in silver, lead and some gold.—E. W. Smith, A. L. Coleman and B. F. Wright of this city, have some of the best looking prospects in the district, and are doing preliminary work with good results. The new district is about five miles from the Riggs mine, from which the owner and one other miner are said to have taken $85,000.

COLORADO

Boulder County—The Charity Mining Company of Salina has been organized and incorporated under the laws of Colorado, with a capital stock of $100,000, divided into 100,000 shares of a par value of $1.00 each, to operate and own the Golden Eagle mines near Salina.—Last week the Boulder County mill shipped out the accumulated concentrates of high grade ore and slimes, in all six cars going to supply the demands of the steel manufacturers in the East. The shipment aggregated in value over $25,000. —During the absence of Manager S. B. Leonard of the Cash mine and mill at Magnolia, all work will be suspended on the property.—A streak of picture ore, measuring an inch in width, was recently encountered between the fourth and fifth levels of the Golden Eagle at Salina.—The U. S. Gold Corporation has purchased and wrecked the Wall Street mill, preparatory to constructing a thoroughly modern and scientific plant under the supervision of Frank Leonard, metallurgist and cyanide expert.—Gustafson and Company, leasing in the 800 level of the Slide at Gold Hill, have a fifteen-inch streak of ore showing tellurium and free gold sufficiently to assure a value of $250 to $300 a ton without sorting. The ore is in the east drift, about 200 feet from the shaft.—It is understood that Manager Henry Meyring is considering the substitution of electric for steam power at the Ingram mine at Salina. The mine is near to the sub-station of the Northern Colorado Power Company at the Black Cloud mill.—It is reported that work on the Mogul tunnel at Eldora will soon be resumed. The tunnel already cuts over fifty veins, some of which have very large bodies of mill ore, and seams of very rich ore. Its operations will provide very heavy supplies for the new cyanide mill.—Preparations are being made to resume work on the Gold lode near Wall Street with a considerable force. The shaft is 400 feet deep with considerable drifting therefrom.—The Sugar Loaf mine near Wall Street is to be worked by leasers on the block system.

Chaffee County—A third car of ore within the last six months was shipped recently from the Mt. Harvard mine at Turret to the Salida smelter. The ore runs something over $40 to the ton in gold, silver and lead. The vein is from sixteen to twenty inches in width, and yields good values. The tunnel is in 400 feet, tapping the vein at a depth of 150 feet.—Drifts are being carried both east and west at the 250 level on the vein at the Saint Paul.—Couse & Serene, lessees of the Magenta mill, at Granite, run 100 tons of Belle of Granite ore this month, making a saving of about thirty-five per cent. of the value, $3 per ton; this netted just about expenses.

Clear Creek County—A. D. Bryant and Company, leasing 906 feet from the main entrance of the main level of the Bellevue-Hudson, in the Georgetown district, are carrying a stope on a body of ore that measures from two to three feet in width, and returns of from 225 to 275 ounces in silver to the ton are being received in settlement from carload shipments. On the hanging wall there is exposed from four to six inches of ruby silver and gray copper which is worth from assay tests from 900 to 1,000 ounces in silver to the ton.—Work has been resumed on the Homestake group of claims on Lincoln mountain by the Homestake Gold Mining and Milling Company, which intends to generate electricity from a valuable water right controlled for the operation of a small compressor plant.—An average of from sixty to seventy tons is being trammed from the east and west drifts of the Atena vein by the Capital Mining and Tunnel Company. In the east drift the ore body has become more solid, now measuring from five to six feet in width. The entire product is said to be of a smelting grade and carries values of from two to ten ounces in gold to the ton.—The mill at the American Sisters mine on Columbian mountain in upper Clear Creek district is running steadily, although no shipments are being made, owing to the low price of lead, zinc and silver.—Steady shipments are maintained from the Millington property on Columbian mountain, where a streak of ore from twelve to eighteen inches in width yields from 150 to 300 ounces silver to the ton.—The big Pelican mill of the Dives-Pelican and Seven-Thirty Mining Company has been remodeled and will be ready to go into commission within a few weeks.—At the Colorado-Central about 1,000 tons of lead-zinc ore are piled on the dumps awaiting a rise in these metals.—The recent strike made in the Joplin tunnel workings is proving continuous. The streak now measures a full twelve inches in width, with values of seventy-three per cent. lead and fifty ounces in silver in the ton.—The Krupp Mining Company is encountering a number of feeders of high grade ore running through the quartz matter in its Belmont adit situated on Saxon mountain.—A train of forty-one cars was pulled out of the Newhouse tunnel a few days ago with the big electric locomotive. Each car contained about two tons of ore, while the cars themselves weighed from 1,200 to 1,600 pounds each. This train was the longest string ever pulled out of the tunnel at one time, and contained about half of the cars owned by the tunnel company.—Work was resumed last week upon the holdings of the Domino Mining Mining and Milling Company, situated on Payne's peak.—Beyers, Shatz & Company, leasing on the Zero level of the Pelican, are reported to have uncovered a nice streak of high grade silver-lead ore. The ore body measures from six to ten inches across and as soon as the workings are in condition an increased tonnage will be broken.—A close corporation of New York capitalists has been formed by Captain E. D. Quigley, of Denver, to renovate the Brighton mine in Boomerang gulch on Seaton mountain, which has been lying idle for twelve years. The new owners will install an electric hoist, clean out and retimber the 300-foot shaft and levels, after which they can start work in the old stopes which have some good bodies of galena ore already exposed.—The properties of the Dollar Savings Mining & Milling Company have been leased to Joseph Bellis, a Denver mining man, who has started cleaning out the Bertha lateral in the Newhouse tunnel.

El Paso County—According to a circular letter to the stockholders issued by the El Paso Mining Company directors, the company's reasons for throwing up its contract on the Roosevelt deep drainage tunnel at Cripple Creek was that the rock was much harder than could have been anticipated and the company could not afford to continue losing money by the work.—Notice of the annual stock-

holders meeting of the Midget Gold Mining Company, to be held in Colorado Springs February 11th, has been given. At this meeting directors will be elected for the ensuing year and the action of the directors in throwing the estate open to lessees will be ratified.

Fremont County.—Most of the working force of the Union mill at Florence, was laid off today on account of the shortage of Cripple Creek ore. Meantime repairs will be made to machinery. The ore from the Golden Cycle mine has been treated here since last November, now goes to the Golden Cycle mill at Colorado City. The owners of the local mill are negotiating for a dump at Cripple Creek which, if secured, will furnish ore for a year.

Gilpin County—Sinking operations have been commenced at the main shaft of the Golden Flint mine in Gamble gulch near Perigo, and the Gilpin-Independence Mining Company will sink it at least one or two hundred feet deeper before they are troubled with surface water from melting snows. It is the intention of the company to erect a mill near the property for the treatment of their own ores, using an aerial tramway for the economical handling of the ores from the mine to the mill.—It is reported that the Fifty Gold Mines Corporation of Black Hawk has ordered two electric pumps, each capable of lifting 300 gallons per minute from a 1,000-foot shaft, being the largest electric pumps in the county, for the Cook shaft. The company has already contracted with the United Hydro Electric Company for 300 horse power.—A new drum and 1,500-foot steel cable has been put on the Sleepy Hollow mine on Bobtail hill and it is the intention of the company to complete the plant by the installation of a 100 horse-power boiler and a modern air compressor, some time before the coming spring. The development force under the direction of Robert Wilkinson, is to be increased from time to time.—A new blacksmith shop has been built for O. V. Thompson on the Treasury property in Packard gulch. The owner is planning to sink a new shaft and may install machinery for that purpose.—The Square Deal Mining and Milling Company, with a capital stock of $300,000 will begin operations in the Quartz Valley and Eureka mining districts.—The East Boston Mines Company, with a capital stock of $1,000,000, will operate the East Boston and Ridgewood properties in the Central City district.—The Smuggler mill in South Moon gulch has been sold to Decatur, Illinois people, who are represented by George M. Ashmore of Rollinsville, the former owners being Hawn & Company. The Smuggler mine was also recently sold to the same parties.—Large ore bins have been built at the main shaft of the Black Hills and Denver Gold Mining Company, in Boulder Park and ores are being piled up in these bins for future shipment.—The Fifty Gold Mines Company are putting in a flume in the Bobtail tunnel to carry the water, which will be pumped to the tunnel level as soon as the new electric pump is installed.

Gunnison County—At the Camp Bird of Pitkin, drifting is in progress from the bottom of the 200-foot shaft to the Camp Bird vein.—The Belzora has been idle for some weeks, but will resume on the return of Superintendent St. John from the East.—The Gold Links mill, after making a very successful test run on ore from the tunnel, has closed down until a great deal more drifting has been done on the veins already opened up.—Work continues unabated at the Camp Bird, where they are crosscutting from the bottom of the 200-shaft to the Camp Bird vein.—The Raymond has resumed operations again, after having been closed down for the holidays.

Lake County—The Luema Mining Company, leasing the Valley and other ground adjacent to the New Mcnarch, on Little Ellen hill, has encountered at the 100-foot point of the shaft a body of lead carbonate running well into silver, lead and gold, several feet of which have been cut.—In the East Tennessee district, the Lucy L., owned by the Gunnell estate, adjoining the Jennie June, has been taken over by Colorado Springs and Cripple Creek parties. The lease is for two years and is made in the name of Alfred S.abrook.—The Cleveland shaft of the New Monarch Mining Company is now down 614 feet, and opens at three levels the main vein which varies from six feet six inches to seven feet and yields from its high grade streaks approximately $10,000 a month in gold, making it the largest and richest vein in the gold belt.—At the Ibex mine 300 men are on the payroll.—After an idleness of more than a month, both the Morning and Evening Star properties on Carbonate hill are to resume under the management of E. D. Dickerman. The principal product of these mines is a manganese material—Leadville capital, organized as the Champion Leasing Company, has undertaken to operate the Champion mine near Red Cliff, in Eagle county.—Not far from the surface of the Ready Cash of the Aurora Mining Company in Iowa gulch, Major A. V. Bohn and others, who are operating the property, have encountered an eighteen-inch vein of high grade sulphide ore, for the first shipment of which settlement had been made at the rate of $250 a ton.—George Bennett, former superintendent of the Coronado, has taken a lease on that property, and now has twenty men preparing to take out ore as soon as the machinery is properly placed.

Mineral County—It is reported that a four-foot body of ore, running forty-six ounces silver with good values in gold and lead has been found on the Schroter property, south of the Nelson tunnel, near Creede.—It is understood that the Commodore mine will resume work just as soon as the price of silver reaches 60 cents and shows that it will remain at that price.—The contract on the Judson tunnel at Spar, has been completed by Arthur Weaver and R. Fisher.

Ouray County.—On the First National, south of Ouray, work has been started in the lower tunnel, which is in over 400 feet, 300 feet of which are are on the vein and a body of ore from one to three feet wide has been exposed for a distance of 150 feet along the vein. The ore is a lead-zinc, some of it running as high as $50 to the ton.—On the Mineral Farm above, a shoot of ore shows from six inches to two feet of solid lead-zinc ore accompanied by five feet of quartz.—The upper tunnel has been run a distance of 200 feet along the vein following ore practically all the way.—The Newsboy, Calliope, Gold Lion and Chipeta mines are inactive this winter.

San Juan County—The Bullion King Mining Company, owning a group of claims in Porphyry basin, about twelve miles from Silverton, has encountered an ore body measuring twelve feet in width and running in the neighborhood of $100 in lead, silver and gold to the ton, in a drift on its Oliver Twist vein. The vein was met in a tunnel 206 feet from the surface.

San Miguel County—The Liberty Bell Gold Mining and Milling Company, owning 250 acres of lode and placed claims in the telluride district, for the year 1907 mined and milled in the gross 105,000 tons of ore, which yielded an income of $750,000. Of this output 17,00 tons was in the form of concentrates, which were marketed at the Durango smelter. Electric equipment for operation of the Stilwell tunnel and the upraise has already been ordered and within a few months, with the completion of the elaborate timbering system will be installed and in operation.—The Silver Chief at Telluride is to be sold for $275,000.

Summit County—Charles Snyder and associates, placer mining on the Swan

river at the mouth of Georgia gulch, propose to work a remaining high bar of rich gravel that drill holes show is worth from $3 to $10 per cubic yard. The drift has already been driven 800 feet, and the 1,200 foot point they will be on bedrock, which is only twenty-four feet deep.

Teller County—The Ruby Mining & Leasing Company recently incorporated by Humphreys & Thompson of Denver and this city, has commenced work on the Ruby and Layfayette claims on Bull hill. The company has acquired a three years' lease on these properties and will thoroughly develop the claims.—The Raven Hill Leasing Company operating on the Damon of the United Gold Mines Company, shipped a car of ore recently from Cameron. The company is mining a fair grade of ore in the first and second levels and the shipment is estimated to return close to two ounces gold to the ton.—Application for patent on Mont d'Or, Robinson, Thomas and Gardner lode claims in this district have been made by Emma F. Rice. The properties contain 40.976 acres.—Anderson & Parks, sub-lessees on block 191 of the Stratton estate, have shipped a car of milling grade ore. The ground under lease is a part of the Lucky Gus claim on Bull hill.

NEVADA

Churchill County—It is expected that the Jack Pot at Wonder, will resume operations shortly after the first of the year. The intention is to sink a permanent shaft about 900 feet south of the present shaft, at a point on the Lizzard No. 1 claim, where no less then seven veins will be within easy reach. The fifty-horse power gasoline engine, already on the ground will be installed on this shaft. Plans are now being formulated for a mill and cyanide plant on the Jack Pot. It is believed that the reduction works will be installed within a few months. General Manager Harris has the plan worked out in detail.—The Nevada Hills Mining Company will soon start construction of a mill at its bonanza mine in the Fairview district. Ore tests conducted at Salt Lake with that idea in view have been satisfactory, results showing a saving of ninety per cent. of the gold and ninety-two per cent. of the silver values contained in Nevada Hills ore.

Esmeralda County—Manager Fred Vahrenkamp of the Bonnie Clare reports that both mining and milling operations will shortly be resumed, the shutdown having been caused by the appointment of a receiver for the company. The company employed eighty-five men at the time of the suspension of operations.—With more than four months during which practically none of the mines and leases of the Goldfield district produced not a ton of ore, owing to labor troubles, the year's production for this camp alone amounts conservatively to 86,283 tons, valued likewise conservatively, at $11,690,300. The tonnage in 1906 was worth roundly $7,000,000 By the time differences are adjusted between the Jumbo Extension and the Consolidated, there will be numerous leases ready to resume and commence operations on Extension's Wedge faction, its Polverede claim and its group in the Diamondfield section, adjoining the Daisy on the south.—The Alta Mining and Leasing Company is unwatering its shaft on the Alta block of the Velvet and is replacing old timbers.—The Goldfield Mining and Development Company, after investigation in the Rawhide district, finds that the showings are sufficiently good to justify the erection of a mill.

Humboldt County—C. W. Watts, general superintendent of the Eclipse Mining Company, with property in the Seven Troughs district, is securing hoisting machinery in Salt Lake City for the mine. Owing to large dumps of milling ore, the company is considering the construction of a milling plant. A vein, one of the several on the group, that has been shown to be twenty-two feet wide and fifty feet long so far, and with an average of $15 gold to the ton, is the latest discovery.—The Mazuma Hills has another care of ore valued at $400 to $500 per ton in gold enroute, and the Reagan lease on this property is hauling its first car of similar ore to Lovelock for shipment to this city.—Frank Jardine, the well-known expert of Utah, representing the George F. Busch interests, has secured a bond on three of the most promising groups in the Gold Circle district, which are known as the Gold Crown and Gift lodes, owned by Manking and Schein, and the Sleeping beauty group, owned by Mears and Baker.—It is reported that the new concentrating process installed at the Glassgow and Western Company's mill at Golconda, a reversal of the usual wet methods of separating the metals from the gangue in the ore, is meeting with perfect success.—It is reported that four inches of ore on the Storey-Nelson ground at Gold Circle will run $20 to the pound in gold.—On the White Iris claim at Camp Toben, a ledge eight feet wide yields values of $20 to the ton, principally in gold.—Galena and copper sulphide have been encountered in the breast of a fifty-foot tunnel on the Gypsey group, owned by Mullin and Schofield.

Lander County—At the bottom of a ninety-foot shaft on the Meager group of six claims at Galena, a vein which runs 300 ounces silver and fifty to sixty per cent. lead, has been encountered.—On the Summit group of D. E. Starret, a 700-foot tunnel has opened up a ledge carrying stephanite and steel galena that runs 400 ounces silver and fifty per cent. lead.

Lincoln County — Superintendent Crozier of the Good Hope mine at Searchlight is sending sample shipments to Colorado Springs to be experimented on by the dry concentrating process and as this method is proving successful, it is probable that a 100-ton mill will be constructed.—The Le Roy Company is pushing work on the new ten-stamp mill, while the Blossom will be ready to commence active operations in mill-building very soon. Several other companies, including the Philadelphia, are also considering methods of reduction.—Fred Ward of the West Extension is planning to start work within a short time, when a plant of machinery will be installed. —In doing the annual assessment work on the Driscoll property, a two-foot vein of ore was encountered, running into picture values.—Smith & Bowman, operating the Shoshone group, Fourth of July mountain, have leased the New Era mill, and stamps will soon commence dropping on a good grade of ore. The small hoist formerly used by the contractors at the Colorado mine, was removed to the Shoshone shaft and development is to be prosecuted on a much larger scale than heretofore. The owners recently encountered a two-foot ledge of $30 ore, and a large body of $5 and $7 rock is blocked out.—On the Prince mine of the Prince Consolidated Mining Company, four miles from Pioche, an ore body five feet wide, running well in silver and lead with some gold, has been uncovered at the 300-foot level of the shaft.

Lyon County—It is now almost assured that the Nevada-Douglas Company will erect a smelting plant at Yerington for the treatment of its ores.—The Native Copper Company announces that within sixty days it will begin the erection of a smelter on its property in the Mason Range, west of the City of Yerington.—High grade ore from the Ramsey-Comstock mine at Ramsey runs $70 to the ton, while milling ore runs from $20 to $70 in gold. For the purpose of further extending the ore reserves and to get in

readiness for much greater monthly production than formerly, the company is at present engaged in driving long drifts both ways on the ledge. It is the intention of the owners to put up a reduction plant.—At the rich Walkover mine, the miners have been put to work drifting from the 100-foot level on the big hanging wall vein. The shaft has been sunk as an incline to follow this rich ore body and it is now proposed to open it up in a thorough manner to permit stoping of ore.

Nye County—The production of Tonopah for the week ending January 4th, was 4,730 tons, at an estimated value of $106,000.—J. R. Bryan and associates have started work on the ground recently leased of the Bullfrog Pioneer Mining Company, in the Mayflower section. The lease takes in all of the Bimetallic No. 3, claim, and is granted for a period of two years.—The new control, called the Pioneer Leasing and Milling Company, is now installing a hoist, and is planning the acquisition of a compressor and a cyanide mill, the latter to be in operation within the next sixty days.—Contract for a twenty-stamp mill for the Mayflower Consolidated Mining Company was signed at San Francisco with the Joshua Hendy Iron works of that city.—The pipes of the Round Mountain Hydraulic Company have thawed out and work resumed. Since the resumption of work a shallow gulch has been entered which yields $200 per cubic yard.—Samples taken from a ledge at the 200-foot level in Mineral Hill ran $109.32 and $28.70.—A number of prospectors have taken up forty or fifty claims and organized a district which they call Stargo, between Hamilton and Tonopah and some fifty miles southwest of Eureka.—The Nevada Smelter and Mines Corporation has equipped its Tybo property with a Snow Station pump on the 400-foot level, a 100-horse power boiler and a six-drill Ingersoll compressor.—At the Southwestern mine in Reveille, the big ore body on the 200 level has been opened up to such an extent as to prove that it is greater than was at first supposed.

White Pine County—In consequence of the present financial conditions, the building of the new twenty-stamp mill at Willow Springs, near the Blackhorse camp, will be indefinitely postponed. The Utah Copper Company has a 6,000-ton concentrating mill, the Boston Consolidated Company a 3,000-ton mill and the Cumberland Ely and Nevada Consolidated Companies are jointly building a 5,000-ton mill as well as a large smelter at Ely, and plans are already prepared for a material enlargement of all these mills, especially the last two.—O. J. McConnell, general manager of the Ely Townsite Company, received the following telegram from William B. Thompson, on New Year's day: "You can rely upon work being rapidly pushed on Steptoe plant, assuring a prosperous New Year to the citizens of Ely."

NEW MEXICO

Socorro County—At the Graphic Company's mine in the Magdalena district the levels are connected by several raises with the sixth level, which was the deepest workings before the Waldo tunnel (ninth level) was run The ore shoot is about 400 feet long, which has been crosscut several times on each level; one crosscut on the ninth level shows 105 feet of ore, horizontally across the ore body, the dip of the strata being about forty-five degrees. The ore is principally zinc sulphile, occasionally merging into zinc-lead sulphide, which requires some mechanical separation. The company has been experimenting on several milling processes, and it is generally understood that they will soon install a concentrating plant. There is abundant water in the mine for milling purposes.—The Mine Development Company, owing to the decline in the price of lead, has suspended shipments. Up to the first of December the output of the Tip Top and Key mines was fifteen carloads a month. In the meantime, the company is pushing development for the economic operation of the several mines along the line of the Tip Top tunnel, which work was necessarily delayed on account of ventilation until the mines were connected.—The Stonewall, a property of the Mine Development Company, operated under lease by William Martin, has been shipping carbonate of lead ore similar to the ore shipped by the company.—Hill brothers, owners of the Capitol group, are driving a tunnel (day and night shifts) to cut a shoot of ore developed by the shaft above.—The Germany company is working the largest force in the camp, developing the Alhambra and Germany mines, both by tunnels, which will be extended to develop and operate properties lying east and above the Alhambra and Germany mines. Both tunnels are crosscutting the formation, the Alhambra is now in 300 feet and will soon reach the crystalline limestone. The Germany tunnel has developed the most persistent shoot of gold ore in the district. It shows six feet in width for 100 feet and was still continuing when the course of the tunnel was changed to crosscut the formation.

SOUTH DAKOTA

Custer County—The Saginaw Mining Company has resumed actual mining and milling after several weeks of construction work occasioned by the fire which occurred on the 16th of September. The new shaft house is equipped with a new Hendrie & Bolthoff 9x10 hoisting engine, having a speed of 400 per minute, a new Browning six K. W. electric lighting of sufficient capacity to light light hoist mill, mine and camp buildings. The Norwalk air compressor was rebuilt by efficient machinists in the employ of the company and is doing good service. The ore will be mined from the 300-foot level, where are exposed five ledges of quartz that are from four to eight feet in width, and bear gold values.

Lawrence County—The North Homestake Company at Maitland, formerly the Maitland mine, is discarding all the old steam machinery and is replacing it with a new and strictly modern electric-driven plant.—The Minnesota Company, whose cyanide mill is nearly completed, has arranged to use electric power throughout its workings.—The Echo Company is just completing the installation of an electric driven mining plant. All of these concerns are securing their power from the Black Hills Traction Company. To open up and work veins developed in the upper drift of the tunnel the Echo company will install also an electric hoisting machine. The present plant of the company includes an electric driven air compressor, blacksmith shop, including drill sharpening machine, etc.—In the Iron Creek district, companies in active operation are the Queen Esther Mining and Development Company, the Arkota Mining Company and the Iron Creek Mining Company.—It is stated that the clean-up from the Homestake reduction works for the last fifteen days of December was the largest in the history of the company. A fire in the Homestake mill at Lead on January 8th, caused the company a loss of $5,000, the plant being without insurance.—The Great Northern Mining Company, with holdings located in Sheeptail gulch, a short distance from Blacktail, has uncovered sufficient ore to warrant the erection of a 100-ton Chilean plant in the coming spring. To create the necessary funds a large amount of stock will be placed on the market.—On the Connie May Morris ground near Roubaix, theshaft is now down sixty-five feet and two eight-hour shifts are adding about four feet a day to its depth. The thirty-five horse

power steam hoist is working smoothly and the new pump is amply able to handle the water which necessitated the placing of the new machinery. There are two good quartz ledges, one on each side of the shaft, and it is the intention to crosscut when the 100-foot level is reached and tap both of these at that level.

Pennington County—Another ledge of free milling gold ore has been discovered at the Lucky Boy mine in the Keystone district.—The Oregrande and Broken Bow groups, consisting of seventeen claims, which comprise over 300 acres, adjacent to the Black Hills-Anaconda, between Crooked and Bitter water creeks, have been sold to J. Perry Atlaffer, W. S. Green and I. R. Lamoreau, of the Sitting Bull, by Messrs. Bickerstaff and McCormick, of Broken Bow, Nebraska.—The Rochford-Wyoming Oil Company is pushing work with a force of men and has encountered oil in two wells at a depth of 400 and 300 feet, respectively, and is now sinking a third, which at present is down 150 feet.—It is rumored that the Pittsburg Company will begin operations in the old King Solomon shaft in the Redfern district.—At the Seminole wolfram mine, west of Keystone, a ledge rich in tungsten has been encountered. W. E. Christierson, half owner of the mine, has a force of men at work on the ledge and intends to form a company and build a milling plant for the handling of the ores.—While doing assessment work on the Rover lode a couple of miles northwest of Keystone last week, P. F. Hayes and James Hopkins made a discovery of some fine looking float ore which came from the ledge which crops out a few yards further up the hill from where the find was made.

MEXICO

Guanajuato.—Some of the mine owners of the Guanajuato camp rather than shut down because of the low price of silver have turned their mines over to the "buscones" who follow the high grade seams and divide equally with the owners One mine owner receives an average of $500 a week as his share of the returns by this method.

Jalisco.—A California company is constructing a railroad from Los Pinos to San Sebastian, opening up a section in the west of Jalisco which has not been available to prospectors because of its inaccessibility.—W. A. Rogers, manager of the West End Realty Company of Guadalajara, has purchased from Leopoldo Romano of Tepic the old Tatepuzco mines on the north side of the Santiago river in the La Yesca district. The purchase includes 12,500 acres of timber land. It is understood that the price named in the contract is $30,000. The first payment has been made.

Sonora.—The new equipment of machinery recently purchased by the Lluvia de Cobre company is now on the ground and practically ready for the compressor in three sections, the aggregate weight being 18,000 pounds, and a special wagon was constructed for hauling in the boiler. It is stated operation. It was necessary to bring that the company anticipates smelting its own ores right on the ground, thus effecting a large saving in freight charges.

Personal

Alfred Skeels of Central City, Colorado, is in Denver.

J. W. Stewart of Searchlight, Nevada, is in Philadelphia.

Franklin R. Carpenter was in Golden, Colorado this week.

A. W. Russell of Salt Lake City was in Aspen, Colorado, recently

Malcolm MacDonald of Tonopah, Nevada, is inspecting property in Mexico.

Charles M. Schwab is in Cuba visiting iron mines in which he is interested.

Philip Argall of Denver, the noted cyanide authority, is in New York for the winter.

C. B. Burgquist of Encampment, Wyoming, is in Chicago where he will spend the next three months.

Samuel McIntyre, Jr., superintendent of the Mammoth mine at Eureka, Utah, has returned from St. Louis.

J. E. Spurr has renewed his arrangement as consulting geologist and engineer for the Guggenheim interests.

Roy F. Rigley, formerly of Telluride, this state, is now manager of an extensive mining property at Zimapan, Hidalgo, Mexico.

George W. Adams has been appointed superintendent of the property of the Valdez Mining Company, near Douglas, Arizona.

E. A. Benjamin of Philadelphia, Pennsylvania, is in the Idaho Springs district, Colorado examining properties for eastern clients.

Richard Linthicum, who is connected with the United Rico Mines Company at Rico, Dolores county, is attending the annual meeting of the company in New York.

Colonel L. Kingbury, one of the rich placer miners of Summit county, is down from Breckenridge for the winter. Colonel Kingsbury will start for New York in a few days.

O. V. Thompson of Louisville, Kentucky, was in Denver on his way to Central City, Colorado. Mr. Thompson is a mine owner in the Gregory district near that city.

Clawson & Gillingham, recently of the Copper Queen Consolidated, are doing assaying as well as consulting engineering practice. They are located in Los Angeles.

Superintendent Coombes, of the Colonial mine, Cobalt, Ontario, retired and Mr. McCaskill of the King Edward mine will have charge of both properties.

S. A. Knowles, superintendent of the Boston Consolidated Mining Company, at Bingham, Utah, is at Colorado Springs, Colorado ,where he has mining interests.

W. H. Sills, manager of the Nevada Empress mine at Gold Mountain, Nevada, is in Denver, Colorado, having tests of ore made preparatory to the erection of a treatment plant.

William McMasters of Bingham, Utah, has acepted a position under R. H. Channing in Peru, South America. Mr. Channing was formerly manager of the Highland Boy mine at Bingham.

Obituary

A. H. Estes, one of Denver's most distinguished pioneers, died at his home in this city of the infirmities of old age, he being past eighty. Mr. Estes was at one time owner of the St. James hotel and other valuable city property, including mining property in different parts of the state. He leaves two sons, A. G. Estes, and Dr. Frank E. Estes, both of this city.

Captain J. W. Boyd, who located the famous United Verde copper mine, now owned by Senator Clark, died in Prescott, Arizona, last month at the age of eighty-six years. Although at one time owner of the second richest copper mine in the United tSates, Boyd died penniless, a charge on the county. The mine, since he sold it, has paid more than $25,000,000 in dividends. Boyd sold it for a few hundred dollars.

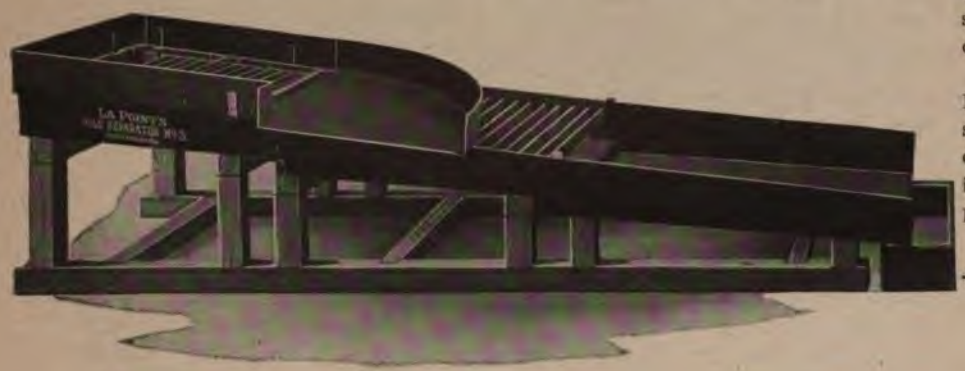
James B. Westhaver, A. M. Ph. D., and professor of physics at the university of Denver died at St. Luke's hispital recently after an illness of two weeks. It was only six years ago that he took his Ph. D. degree at the University of Leipsic, Germany. He was a native of Luresburg, Nova Scotia, where he was born in 1862. He came to Colorado in 1891 and became principal of Valverde school, which position he held for six years. He then entered the University of Denver and was graduated in 1900 with the B. A. degree. He was assistant professor of physics and then went to Germany for further study. Dr. Westhaver married Miss Cora Taylor in 1902, and is survived by the widow and three children.

MACHINERY AND EQUIPMENT

Under this heading will be set forth the adaptability of machinery for certain work, and conditions under which machinery is to be used. We invite our readers to ask questions in this column regarding any machine on the market, and they will be answered by authority on the subject. Address: Machinery and Equipment Editor, Mines and Mining, 1824 Curtis Street, Denver, Colorado.

THE C. A. LA POINT FLOUR GOLD SEPARATOR.

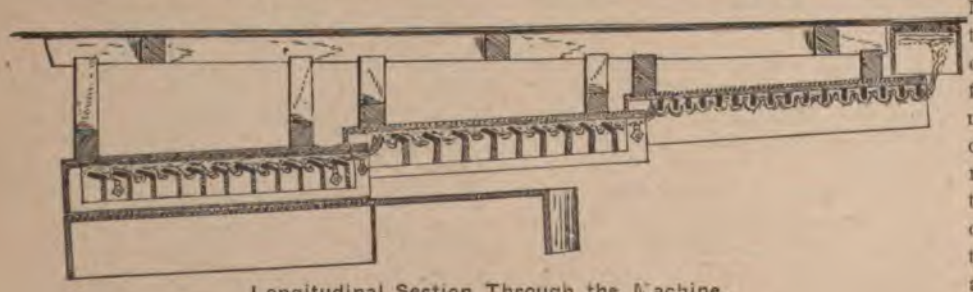
The La Point Gold Separator, which has been attracting a great deal of attention lately, is an interesting example of how the laws of nature may be utilized in the service of mankind. The inventor, C. A. La Point, is a placer miner of many years' experience and his machine is the result of long study on a method of saving the flour gold in placer operations.



The La Point Separator.

Probably more failures in placer mining of the United States are due to the loss of flour gold than any other cause, and an invention that will save these elusive values is of estimable benefit to the mining public. The La Point machine has been tried on the placer fields along the Snake river in Southern Idaho, where former attempts were fruitless, and the results were remarkable in that, even careful pannings failed to reveal any trace of gold in the tailings.

In construction the machine is very simple, and after the first cost, requires no expense except the time of the operator. The separator consists of three sections, built of sheet steel and each about three feet in length, making the total length of the machine nine feet. These sections can be folded or telescoped for ease in transportation and convenience in handling. Inside the first two sections are suspended riffles, which are concaved to the direction of the flow, and are made of galvanized iron. The flow is obtained by a drop of about one inch to the foot and the riffles are placed from one to one and one-half inches, according to the depth of water. However, in each case the bottom of the riffles are just submerged, and as the water reaches each riffle it mounts the incline caused by the concavity and, owing to the continuous upward force of the water, the returning flow must fall on the outside of the upward current, thus precipitating the water upon the floor of the separator, where the gold is caught in the web of brussels carpet. As this water carries the flour gold floating upon the surface, every particle is held by the carpet. The coarser gold goes to the third section, where it is readily caught by the ordinary riffles. It has been found by experience that eighty per cent. of the gold caught is in the first couple of feet, but in order to be certain of saving all the values, additional length is used. A coarse screen over the first section allows the gold and finer gravels to pass through to the riffles below, thus eliminating the coarser stuff and increasing the capacity of the machine.



Longitudinal Section Through the Machine.

When the carpet on the floor of the separator is to be cleaned up, it is taken from the machine and run around a roller placed in a long pan, and with the wrong side against the roller and the pan full of water, the tapestry brussels is moved up and down, which speedily removes the gold so completely that not even a color can be found with a glass.

The confidence of the C. A. La Point Company in their machine is shown by their offer to place any machine in actual operation and prove its effectiveness before the purchase price is paid.

THE MERRALLS MILL COMPANY OF DENVER AND SAN FRANCISCO.

A well-known government official once said in regard to men, that the greatest fundamental difference between men, the reason why some fail and some succeed, is not a difference in opportunity but a difference in vision and loyalty to ideas. The truth of this statement is apparent, for where one man fails to see an opportunity, another grasps an idea whose development often leads to remarkable ends. Such will impress you as the case after meeting Mr. Merralls of the Merralls Mill Company of Denver and San Francisco, California. There are many mining engineers and mill men who have spent their lives around batteries contented with the existing conditions, but it remained for Mr. Merralls to be the one to use his experience for the advancement of stamp mill practice.

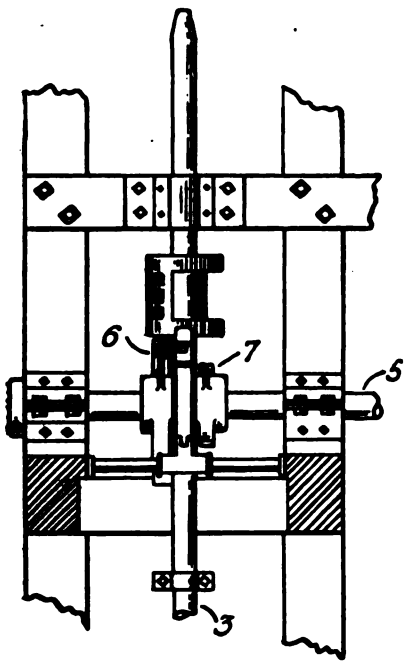
There is one noticeable feature about all the advantages possessed by the Merralls Stamp Mill, and, i. e., that the efficiency of every improvement can readily be seen, being based on fundamental physical laws. In many new appliances placed upon the market, one must take for granted the claims made by the inventor, but in this case, the improvement are so apparent that offers to prove every statement or letters, testifying to satisfaction given, are unnecessary, and you cannot help

wondering why no one saw the possibilities before.

In describing a Merralls Stamp it would take too long to go into detail,, but a mention of the characteristics and the resulting advantages will give an idea of its superiority over other styles. The principal differences between the Merralls and the ordinary stamp are given below:

(a) Individuality of the mortar.
(b) Heavier and larger stamps.
(c) Greater discharge.
(d) More even feeding.
(e) A double acting cam.

The benefit derived from an individual mortar is easily seen is it permits the repair of any single stamp without the suspension of the remaining four as in an ordinary five stamp battery. This means increased capacity.



Merralls' Improved Double Acting Cam.

In regard to larger and heavier stamps, Mr. Merralls has simply forestalled the ultimate trend of stamp mill practice for engineers on the Rand in South Africa, have reached the same conclusions and are now putting in 1,600 to 1,800 pounds stamps. The Merralls' Stamp is built in weights varying from 1,250 to 3,000 pounds. The advantage thus gained is, greater capacity, owing to the larger crushing surface obtained by a greater bearing area of shoe and die. For instance an 850 pound (with 8½ inch diameter) stamp has an area of approximately fifty-six square inches, while a 2,000 pound stamp having fifteen-inch diameter has an area of about 198 square inches, which is over three and a half times as great as the former. However, this increased capacity for crushing the ore would be useless were it not for the improvements given under (c).

This advantage, that of greater discharge is obtained by the use of screens on the front, back and sides instead of only in front as usually found. This gives an area of from fifteen to twenty square feet on a Merralls' five-stamp mill as compared with the three square feet of old style batteries, or from five to seven times the discharge area. It is a well known fact that a stamp will crush several times the amount of ore it can discharge, and in the ordinary type of battery, this excess is pulverized again and again producing a considerable quantity of undesirable slimes. Another commendable feature about the screens is, that they are inclined (and not perpendicular), which is the logical position for greatest efficiency.

More even feeding is secured by charging the ore at three different points, thus producing even wear upon die, for where the ore is fed only at the back, the heel of the die is naturally worn down, thus decreasing the capacity in proportion to the amount of the wear. In a Merralls' stamp all sides of the shoe and die wear equally, because of an equal distribution of the ore under the stamp, also the breakage of the stem is often caused by pieces of ore falling upon the worn side of the die and throwing the stem out of alignment.

The double acting cam, which is one of the greatest improvements made by Mr. Merralls, consists of two cams, a long one and a short one, on opposite sides of the stem. The longer one performs the same function as the ordinary cam, while the short one is disengaged from the tappet immediately after it is raised, and is introduced to prevent binding of the stem in the upper guide frame. In overcoming inertia it a basic law of physic that the greatest power is needed at the start, hence by force applied on both sides of the tappet, a straight lift is obtained and a great saving in power effected. Owing to the shortness of the cam, the turning action is still retained as before, and it allows even wear of the shoe and die.

Only the main points of the Merralls stamp have been mentioned above, for lack of space; however, those given are sufficient to show its value. In addition to this as proof to any doubting Thomas, it might be mentioned that the inventor, Mr. Merralls, guarantees a capacity for each stamp of ten tons per twenty-four hours through a twenty-eight mesh screen, and has some strong letters as testimonials, which make still stronger statements. The stamp will, undoubtedly, run on two-thirds less power in proportion than the usual five stamp battery and with two-thirds the wear.

In addition to this stamp, the Merralls Mill Company make an Improved Roll Rock Breaker, that is certainly a departure from the standard type and is giving great satisfaction. The company is prepared to equip any kind of cyanide and concentration plant, as it handles ore cars, ore feeders, water wheels, mills, etc. The office is at 211-212 Quincy building, Denver, Colorado.

The Ocean Giving Up Its Treasure

The Westminister Gazette states that natives of Mundesley-on-Sea are picking up on the foreshore coins of gold and silver said to be washed ashore from long sunken wrecks. But Norfolk has no monopoly on these crumbs from Davy Jones' locker. They say that after westerly gales you may pick up old gold coins on the Gunfleet, off the Essex coast, samples of half a million others which went to the bottom of the sea on a Dutch vessel, the Vrowve Polder, when the eighteenth century was an infant. On the beaches near Flamborough Head similar treasure has been picked up (too rarely, it is admitted), part of a reputed three millions in gold carried by the good ship Czarina when she struck on Filey Brig and foundered with all hands while many a silver bar has enriched its lucky finder, according to report, on Chesil Beach near Portland, the too miserly tribute of a Dutch treasure ship which is said to have £1,500,000 worth of similar treasure still in her hold.

The use of silica in manufacturing chemical apparatus has met with remarkable success. Evaporating basins, beakers, crucibles, flasks, retorts, test tubes and other vessels are now made wonderfully clear and homogeneous and the cost has been reduced seventy-five per cent. The advantages of the new utensils are really extraordinary. The vessels are thin, strong, tough and harder than ordinary glass, they are not cracked by the most violent and sudden changes of temperature they will endure about the same temperature, as platinum without melting and their expansion is about a seventeenth of that of pltinum.

The "law of apex" is said to be responsible for nearly nine-tenths of the mining litigation in the United States.

THE STOCK AND METAL MARKETS

New York

Jan. 16.—Stocks still remain firm, although no marked increase was noted this week. Little improvement is shown in the copper situation since the first of the year, 14 cents being the price of electrolytic.

A prominent wire rod manufacturer says that while his plant at the moment is working on some old orders, there is nothing new in sight at the moment. The demand for wire is flat and in many instances the manufacturers have shut down some of their plants and in others are working but a few hours a week.

During August, 1906, the wire manufacturers of the United States, most of whom belong to an association of wire drawers, used 32,000,000 pounds of copper, according to official statistics. In August, 1907, the exact amount used in the manufacture of wire by the same manufacturers had fallen to 9,000,000 pounds.

The late months of 1906 and the first quarter of 1907 were admittedly the heaviest as regards consumption of copper ever witnessed, and at the moment it is estimated that as compared with a year ago, consumption is about 25 per cent.

J. Parke Channing, the eminent mining engineer and president of the Tennessee Copper Co., says:

"Basically, the copper situation is no different than it was a year ago. The legitimate demand is and will continue to increase as electrical development continues to increase in the country, and at the same time the production will only about keep pace with the increased demand. The supply of raw material, that is, of copper ores, is limited.

"It seems quite likely that before the end of the year 16 or even 17 cents may be expected for the metal. While the law of supply and demand undoubtedly governs the immediate price of copper, ultimately the cost of production is one of the principal items. The cost of producing copper has unquestionably advanced two cents in the last three or four years, and, therefore, to make even the same return, a price of 17 cents today would only equal that of 15 cents three or four years ago, which at that time was considered a nominal price for the consumer and producer alike.

"It seems quite likely that there will be no increase in the production by any of the closed mines until copper shall have gone beyond 15 cents."

Following are the quotations:

	Close.
Amalgamated Copper	51⅞
American Smelting	74¾
do, pfd.	93
Colo. Fuel & Iron	21½
Anaconda Copper	32⅝
Republic Steel	18
U. S. Steel	29½
do pfd.	94¼
General Electric	121
Utah Copper	25
National Lead	40½

Curb Quotations.

*Stock.	Bid.
Arizona Commercial	17.75
Ahmeek	60.00
Cumberland Ely	8.25
Davis-Daly	4.50
Empire Copper	1.50
East Butte	4.12½
Giroux	4.00
Greene Cananea Copper	7.37¼
Globe Cons. Copper	7.50
Hancock	4.50
Keweenaw	....
Nevada Utah	5.75
Nevada Cons.	11.62½
Nipissing	7.00
Superior & Pittsburg	13.25
Shattuck	18.00
Utah Apex	3.87½
Warren	5.37½
Wolverine Arizona	2.37½
Majestic	1.62½
Butte & London	.90
Shawnee	35.00
Troy	90.00

*Otis & Hough.

Boston

Jan. 16.—Following were the closing quotations on mining stocks today:

*Stock.	Bid.
Adventure	2.62½
Arcadian	5.50
Allouez	30.50
Atlantic	11.87½
Bingham	4.12½
Boston Cons.	14.87½
Balaklala	3.87½
Butte Coalition	17.75
Calumet & Hecla	615.00
Calumet & Arizona	109.00
Centennial	27.25
Copper Range	61.75
Daly-West	8.50
Franklin	9.75
Granby	....
Isle Royale	22.50
La Salle	16.62½
Mass	4.00
Michigan	12.00
Mohawk	55.00
North Butte	51.25
Old Dominion	33.75
Osceola	88.00
Parrot	12.25
Quincy	....
Shannon	12.00
Tamarack	....
Trinity	17.25
United Copper	7.00
U. S. Smelting	34.00
do, pfd.	39.50
Utah Cons.	35.00
Victoria	5.25
Winona	5.75
Wyandot	.90
Wolverine	125.00
Santa Fe	2.25
Oil	10.75
Zinc	24.75

*Otis & Hough.

Colorado Springs

Jan. 16.—Following were the closing quotations on mining stocks today:

Mines.

Stock.	Bid.
Acacia	07⅞
Black Belle	03
C. C. Cons.	04¾
C. K. & N.	06
Dante	08½
Dr.-Jack Pot	07⅝
Elkton	50¼
El Paso	28½
Fanny Rawlins	07½
Findley Cons.	38½
Gold Sovereign	04½
Gold Dollar	06
Index	02
Isabella	35¾
Jack Pot	05
Last Dollar	....
Lexington	02½
Mary Cashen	....
M. McKinney	33
Mollie Gibson	03⅛
Moon-Anchor	01⅛
Old Gold	03⅛
Pharmacist	04
Portland	95
Prince Albert	01
Vindicator	81
Work	16½

Unlisted.

Stock.	Bid.
Golden Cycle	43
Jennie Sample	02½
Jerry Johnson	07⅜
Un. Gold Mines	06¼

Prospects.

Stocks.	Bid.
Agnes	....
Anchor	002
Aola	002
Banner	01⅛
Buckhorn	007
C. C. & M.	009
Cr. & C. C.	01
Des Moines	006
Gold Bond	01
Gould	02
Hart	02
Ida May	02
Jolly Jane	007
Keystone	01⅜
Little Bessie	0065
Little Nell	01
Little Puck	01⅛
Mary Nevin	01⅞
Merrimac	004
Mountain Beauty	07½
National	01¼
New Haven	006
Pilgrim Cons.	01
Pointer	004
Princess	008
Raven & B. H.	009
Republic	0085
Requa Savage	03
Robert Burns	005
Rose Maud	02
Rose Nicol	01
St. Thomas	01
Teutonic	01

Miscellaneous.

Stocks.	Bid.
Black Wonder	....
C. Gold Camp	0035
Favorite	002
Flower of West	0055
Golden Age	....
Goldstone	002
Hummer	0045
Key West	....
Kitty	002
Lucrative	....
Mariposa	....
O. K.	007
Pythias	001
Red Spruce	....
Uncle Sam	....

Nevada

(Furnished over the private wire of O. L. Malo & Co., 221-223 Boston Bldg., Denver, Colorado.)

San Francisco, Cal., Jan. 16.—Following were the closing quotations on mining stocks today:

Comstock.

Stocks.	Bid.
Ophir	1.30
Mexican	....
Gould & Curry	16
Cons. Virginia	65
Savage	61
Hale & Norcross	....
Yellow Jacket	1.50
Belcher	35
Confidence	70
Sierra Nevada	48
Exchequer	20
Union	....

Tonopah.

Stocks.	Bid.
Tonopah of Nevada	5.25
Montana Tonopah	1.87½

Tonopah Extension	1.40
MacNamara	22
Midway	67
Tonopah Belmont	74
Tonopah North Star	10
Ohio Tonopah	....
West End Cons	30
Rescue	04
Tonopah & California	02
Golden Anchor	03
Jim Butler	37
Cash Boy	....
Monarch Pittsburg Ext	01
Montana Midway Ext	02

Goldfield.

Stocks.	Bid.
Sandstorm	20
Columbia Mountain	17
Jumbo Extension	54
Vernal	05
Pennsylvania	....
Kendall	09
Booth	18
Blue Bull	18
Adams	06
Silver Pick	29
May Queen	05
Nevada Boy	03
Black Butte Extension	04
Blue Bell	08
Dixie	03
Goldfield Columbia	05
Hibernia	03
St. Ives	46
Conqueror	04
Black Rock	02
Lone Star	10
Goldfield Wonder	....
Potlatch	14
Oro	09
Kendall Extension	01
Sandstorm Extension	01
Mayne	02
Atlanta	32
Great Bend	17
Simmerone	03
Empire	04
Red Top Extension	12
Florence	4.07½
Diamondfield B. B. Cons	18
Goldfield Daisy	98
Laguna	80
Combination Fraction	70
Great Bend Annex	03
Milltown	....
Black Butte Bonanza	02
Kewanos	34
Esmeralda	02
Portland	12
Crackerjack	08
Frances Mohawk	30
Red Hills	36
Mohawk Extension	05
Lou Dillon	04
Yellow Tiger	15
Grandma	07
Silver Pick Extension	....
Yellow Rose	03
Columbia Mount. Ext	....
Goldfield Cons	5.35
Diamondfield Triangle	08
Coming Nation	03

Bullfrog.

Stocks.	Bid.
Original	01
National Bank	11
Lige Harris	01
Amethyst	06
Gold Bar	35
Denver Bullfrog Annex	03
Bonnie Clare	10
Mayflower Cons	17
Montgom'y-Shoshone Ext	....
Golden Sceptre	02
Montgomery Mountain	12
Bullfrog Diamondfield	04
Homestake Cons	55
Yankee Girl	02
Nugget	04
Tramp Cons	18
Victor	....

Manhattan.

Stocks.	Bid.
Manhattan Cons	23
Manhattan M. Co	02
Gold Wedge	04
Seyler-Humphrey	03
Dexter	09
Little Joe	....
Crescent	01
Combination	01
Mustang	11
Cowboy	01
Original Manhattan	....
Broncho	03
Jumping Jack	....
Pinenut	04
Buffalo	....
Yellow Horse	02
Indian Camp	04
Mineral Hill	11

Other Districts.

Stocks.	Bid.
Fairview Eagle	40
Nevada Hills	2.85
Pittsburg Silver Peak	1.45
North Star Wonder	....
Eagle's Nest	18

Salt Lake City

Jan. 16.—Following were the closing quotations on mining stocks today:

*Stock.	Bid.
Alice	2.00
Ajax	20
Butler-Liberal	03
Bullion Beck	1.00
Beck Tunnel	62
Black Jack	24½
Colorado	2.42½
Carisa	19
Copper Glance	12
Columbus Cons	2.00
Cons. Mercur	30
Daly Mining	1.25
Daly-West	....
Daly-Judge	3.25
Eagle and Blue Bell	1.00
Grand Central	2.72½
Honorine	....
Ingot	....
Lower Mammoth	60
Little Bell	1.32½
Little Chief	3.50
Mammoth	1.70
May Day	32
Mason Valley	1.07½
New York	16½
Mountain Lake	32
Ontario	....
Ohio Copper	2.95
Nevada Hills	2.65
Standard	22½
Sacramento	04
Silver King	3.00
Silver Shield	04
South Swansea	05¼
Swansea	....
South Columbus	58
Tetro	01
Uncle Sam	50
Utah Mining	1.40
Victoria	90
Victor	07¾
Wabash	91
Yankee	36
Iron Blossom	30
Sioux Cons	14½
Crown Point	16
Seven Troughs	37½

*Otis & Hough.

TODAY'S QUOTATIONS.

Bar silver	$ .55⅜
Lead, St. Louis	3.65
Spelter, 100 pounds, St. Louis	4.50
Copper, coasting brand	13.25

Corporation Affairs and Finances

Directors of the Cripple Creek Central Railroad Company have passed the dividends on both common and preferred stocks.

The company has been paying one per cent quarterly on the preferred stock and one and one-half per cent. quarterly on the common stock.

In an official statement the directors say that this action was largely due to the fact that the cash assets of the company are involved in the failurer of Kessler & Co.

Montreal—Directors of the Dominion Coal Co., Ltd., have declared the regular semi-annual dividend of 3½ per cent. on the preferred stock, payable February 1st. Books close January 20th and reopen February 1st.

UNITED STATES TREASURY.

Fiscal year 1907-8:

	Jan. 13	This Month.
Receipts	$1,883,391	$19,757,456
Expenditures	2,020,000	21,750,000
Deficit	$136,609	$1,992,544
Receipts	$1,726,181	$21,193,706
Expenditures	2,240,000	18,140,000
Deficit	$513,819	*$3,053,706

*Surplus.

	Jan. 13, '08	Dec. 13, '07
Av'ble cash bal.	$265,899,894	$258,020,932
of which in bks	253,352,306	243,021,473

National bank notes received for current redemption: This day, $1,703,754; this month, $9,973,494; fiscal year, $117,449,036; national bank notes awaiting redemption, $15,680,829; 5 per cent. redemption fund, $27,512,743.

NEW YORK SUB-TREASURY.

	Paid to banks	Received From Banks.
January 11	$3,583,000	$.902,000
Since Friday	7,624,000	7,800,000

Sub-treasury debtor at the clearing house on Monday $1,850,437. Pension checks and postoffice warrants for transportation of the mails were the most important items. The banks have lost to the sub-treasury since Friday $176,000, and for the same period the sub-treasury was debtor at the clearing house $1,666,393.

A modification of the injunction granted to the farmers of Salt Lake valley has been issued by the United States Circuit Court of Appeals and the smelter at Murray, Utah, belonging to the A. S. & R. Company, will be allowed to continue, provided it installed a system of flues and bag houses to collect the fumes.

The coal-carrying railroads have asked a postponement of the time allowed them to dispose of their coal properties, which they must do by May 1st, according to a recent act of Congress. The roads plead a loss if forced to sell during the financial depression. The attorney general has taken the petion under advisement.

The Bunker Hill & Sullivan Mining and Cencentrating Company, of Wardner, Idaho, has declared its first dividend of the year, amounting to $60,000. This dividend, No. 124, brings the mine's total dividend paid to date up to $9,876,000.

Owing to the activity of blast furnace work in the Connellsville district, the H. C. Frick Coke Company has ordered the firing of 1,400 coke-ovens. Owing to the exodus of foreigners, a shortage of help is probable.

The National Tube Company resumed work in the big plant at McKeesport this week.

Professional Directory

Engineers

BANDMANN & ADAMS,
CONSULTING AND EXAMINING ENGINEERS,
Manadnock Building, San Francisco. All Codes.

BATCHELDER, J. F.,
MINING ENGINEER,
54 First St., Portland, Ore.
Specialty—Magnetic separation black sands, saving gold and platinum values.

BLANCHARD, RICHARD,
MINING EXPERT,
Cripple Creek, Colorado.

CARPENTER & SONS, FRANKLIN R.,
MINING AND METALLURGICAL ENGINEERS,
Equitable Building, Denver, Colorado.
Cable Address: "Carpenter."

CHURCH, L. C.,
CONSULTING AND MINING ENGINEER,
Lead and Zinc a Specialty,
Joplin, Missouri.

CLARK, ARTHUR B.,
METALLURGIST,
Alma, Colo.
Mines examined and reported on.

Spencer W. Clawson. John W. Gillingham.
CLAWSON & GILLINGHAM,
MINING ENGINEERS,
Examinations, reports and assaying. Late of Copper Queen Consol. Mining Co.
315 to 317 Lankershim Bldg.,
Los Angeles, California.

CRAMER, FRED C.,
CIVIL AND MINING ENGINEER,
Breckenridge, Colo.
Established 1881, examinations, reports, patents, management of mining property.

DICKINSON, H. P.,
MINING ENGINEER,
General manager The Hoosac Tunnel and Mining Company, Idaho Springs, Colorado.
Denver Address, Denver Athletic Club.

FRENZEL, A. B.,
Rare minerals and expert examination of rare mineral deposits.
1540 Sherman Ave., Denver, Colo.
Laboratory, 2441 Logan. Cable Address, "Frenzel."

KENNER, ALVIN R.,
MINING ENGINEER,
Chicago, Illinois.

HOSKINS, ARTHUR J.,
MINING ENGINEER,
Colorado School of Mines,
Golden, Colorado.

ANK & FOWLER,
CIVIL AND MINING ENGINEERS,
Central City, Colo.
U. S. deputy mineral surveyors. Surveys, maps and reports. Gilpin county maps.

SHAFFER, W. L.,
MINING ENGINEER,
Idaho Spring, Colorado.

SMITH, JAMES F.,
MINING ENGINEER
Cripple Creek, Colorado.

SPRAY, S. J.,
U. S. DEP. MINERAL SURVEYOR,
Civil and Mining Engineer,
Opera House Block, Salida, Colorado.

THOMAS, CHAS. S.,
CIVIL AND MINING ENGINEER,
Office, Court House, Ouray, Colo.
U. S. deputy mineral surveyor; county surveyor.

VAN WAGENEN, HUGH R.,
MINING ENGINEER,
P. O. Box 1346, Denver, Colorado.
Code-Bedford, McNeill.

Chemists and Assayers

ALEXANDER, M. G.,
ASSAYER AND CHEMIST,
P. O. Box 913 110 East Fifth St.
Leadville, Colo.

BURLINGAME, E. E. & CO.,
ASSAY OFFICE AND CHEMICAL LABORATORY,
1736-1738 Lawrence St., Denver, Colo.
Established in Colorado 1866. Samples by mail or express will receive prompt and careful attention.
Gold and silver bullion refined, melted and assayed or purchased.
Concentration tests—100 lbs. or carload lots.

BURTON, HOWARD E.,
ASSAYER AND CHEMIST,
Leadville, Colo.
Specimen prices: Gold, silver, lead, $1; gold, silver, 75c; gold, 50c; zinc or copper, $1. Mailing envelopes and full price list sent on application.

CAMPBELL, A. M.,
ASSAYER AND CHEMIST,
Denver, Colorado.
1417 Lawrence street. Office Phone, M. 7437. Residence Phone, W. 1624.

CLARK, W. A.,
ASSAYER AND CHEMIST,
Gunnison, Colo.
"Specimen Assay" Prices.

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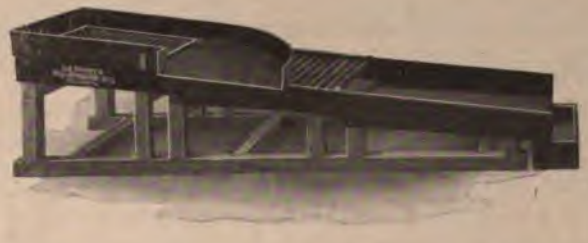

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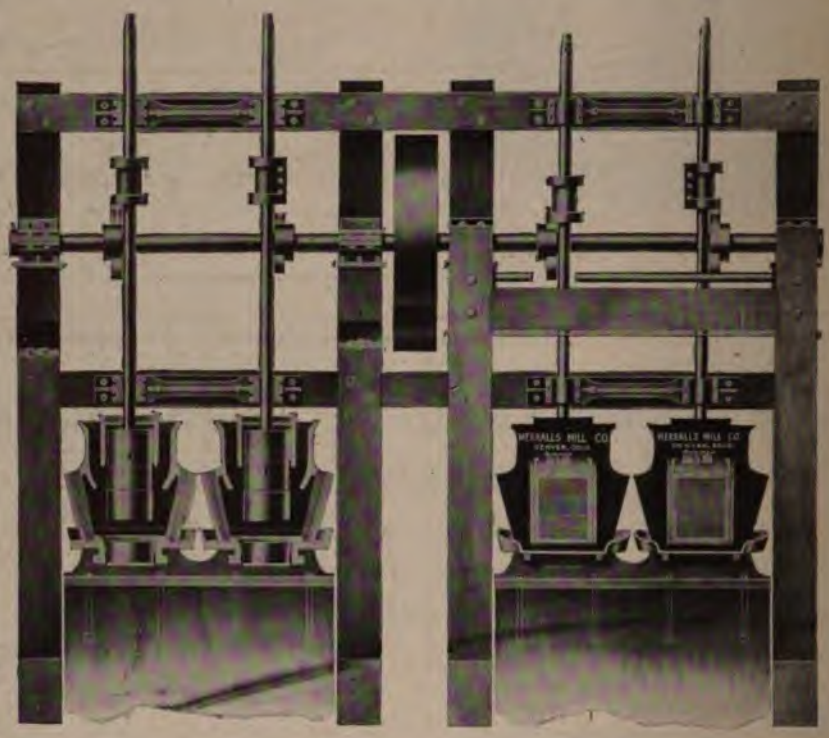

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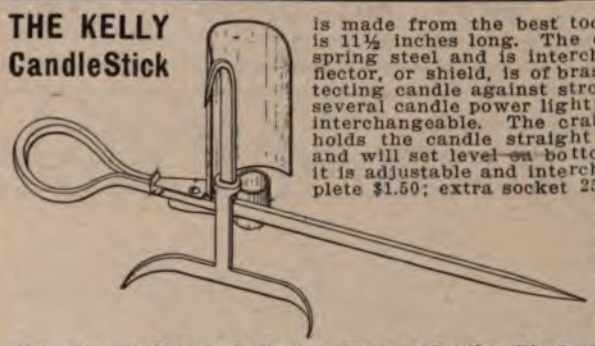

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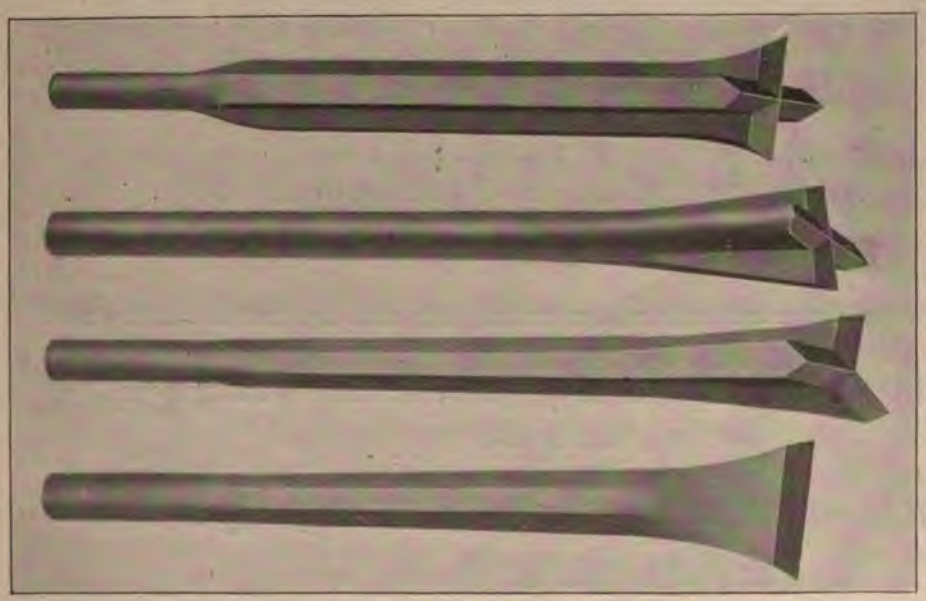

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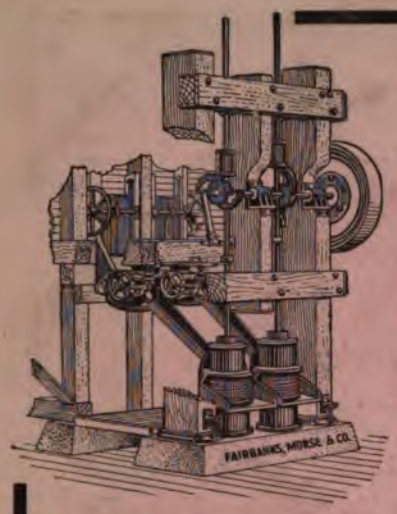

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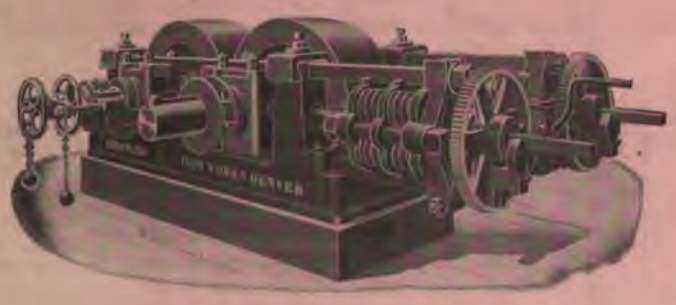
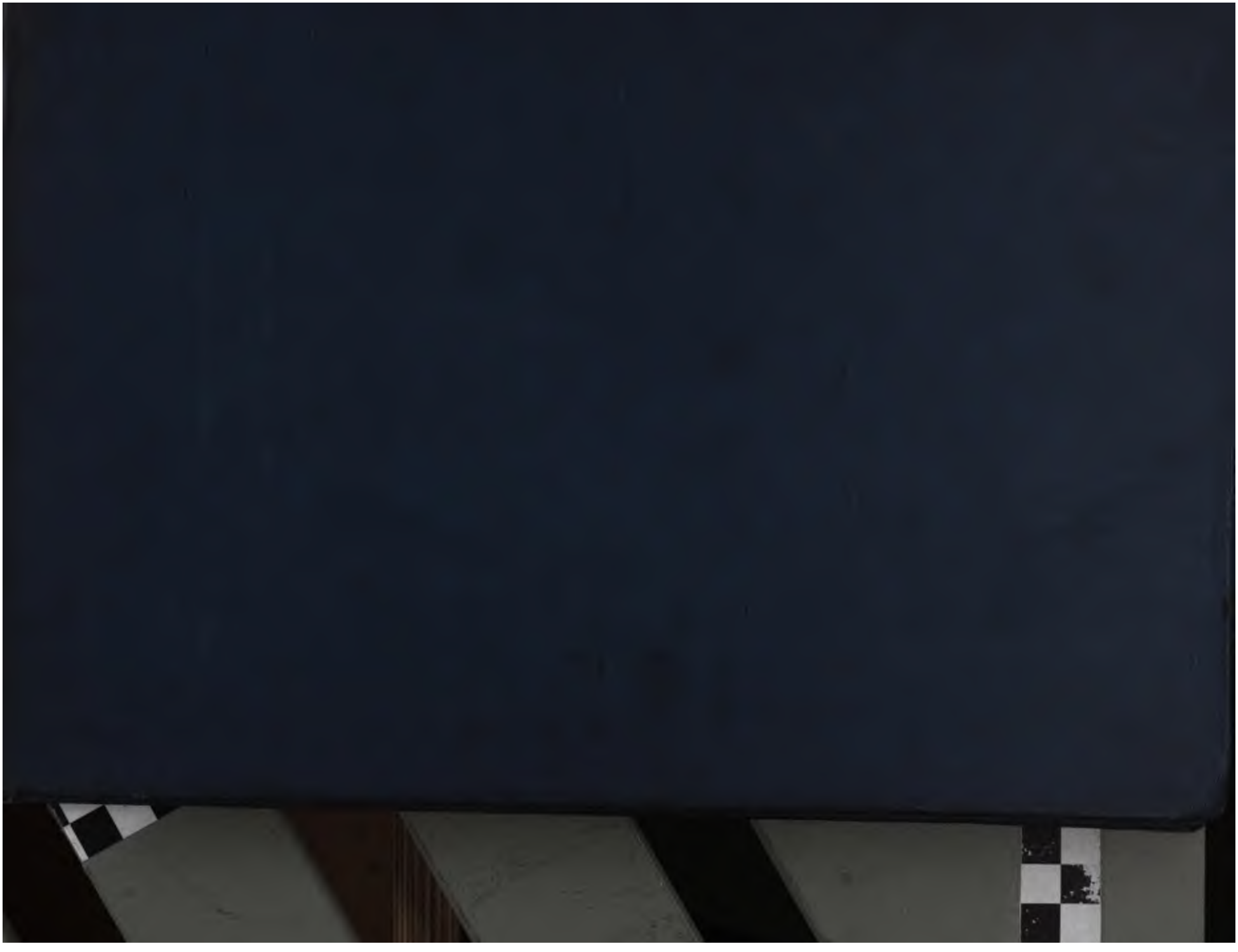
ORE SMELTING EQUIPMENTS — ORE MILLING MACHINERY

Milling Equipment



¶ We are very large builders of machinery and appliances used in and about works for the treatment of ores by all modern processes, and are prepared to undertake the erection, complete, of efficient and thoroughly modern plants. Many of our productions embody special and exclusive features of proved excellence, not to be found in other lines. If planning the installation of mining machinery, write us. We have a corps of experienced, practical engineers, whose services are at your disposal to assist in formulating plans for a successful system of treatment.

COLORADO IRON WORKS COMPANY, Denver, Colo., U. S. A.